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Oil Spill Response Technology Initiation Decision Report to the Pollution Abatement Ashore Program

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ADMINISTRATIVE INFORMATION

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EXECUTIVE SUMMARY

This Initiation Decision Report (IDR) to the Naval Facilities Engineering Command Pollution Abatement Ashore (PAA) Program describes a review and prioritization of potential technologies that could be used to reduce response costs and environmental damage from accidental spills of oil into the aquatic environment. The ultimate goal of the IDR was to provide PAA Program with a roadmap for making future technology investments in spill response.

The approach taken was to identify needs of the spill responder community through direct solicitation of Navy On-Scene Coordinators (NOSCs) via email and phone calls, by attending spill drills and training exercises, through informal conversations at drills and exercises, and reviewing the literature and the Internet. Once the needs were identified, a list of technologies was placed into a matrix that was divided into several response categories: Prevent, Sense, Assess, Coordinate, Recover, and Support. The NOSCs then ranked each technology as very high (1), high (2), medium (3), low (4), or very low (5) priority. These rankings and an initial assessment of feasibility and implementation were used to develop the following prioritized list of recommendations for investment by the PAA Program:

1. **Improved oil spill trajectory modeling.** The NOSCs identified the need for better access and more accurate trajectory models for Navy-specific areas of responsibility (AORs) as one of two top-ranked needs.
2. **Spill Kits.** The spill kit was the other top-ranked technology need identified by the NOSCs. Spill kits consist of a group of laptops and peripheral hardware that is preloaded with software, forms, and documents networked together for use within the response command center. The spill kits would provide the infrastructure for using other identified technology needs such as running models, video streaming and other wireless data transfers, electronic forms, and incident management software, etc.
3. **Improved locating and tracking spills.** The need ranked third was for better tools to locate (areal extent and thickness) and track spills. Investment areas should include systems that provide real-time visual and other optical data that can be readily adapted for use with existing aerial assets (locating and tracking). Other recommended investments include improvements to drifter buoys (e.g., physical modifications, implementation techniques), real-time data transmission of drifter locations, and evaluation of manual spill thickness techniques.
4. **Video and data streaming.** This highly ranked need was included as a subset of the other technology investments (e.g., spill kits), but merits independent consideration for PAA Program investment. The ability to send back live video and other data from the field offers a potentially large increase in situational awareness otherwise unavailable.
5. **Support.** Two needs could not be prioritized by the NOSCs because they were identified too late in the process. The first included additional training, modeling, or sensors that could be used in the NOSCs' recently expanded AORs. The PAA Program should ensure that projects that go forward should at least consider where the tools or techniques can be used, whether within bays and harbors or in open ocean conditions. The second need was to develop a model to determine exposures and associated health risks of Navy spills to responders for identifying when personal protection equipment would be required. The PAA Program, in direct consultation with the NOSCs, should consider development of this model as another possible investment area.

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ACRONYMS

ACP	Area Contingency Plan
ADIOS	Automated Data Inquiry for Oil Spills
AOR	Area of Responsibility
CNRHI	Commander Navy Region Hawaii
CNIC	Commander Navy Installations Command
CNMA	Commander Navy Region Mid-Atlantic
CNRMW	Commander Navy Region Midwest
CNRNW	Commander Navy Region Northwest
CNRSE	Commander Navy Region Southeast
CNRSW	Commander Navy Region Southwest
CODAR	Coastal Ocean Dynamics Applications Radar
COP	Common Operational Picture
COTS	Commercial Off-the-Shelf
FOSC	Federal On-Scene Coordinator
GIS	Geographic Information System
GNOME	General NOAA Operational Modeling Environment
ICS	Incident Command System
IDR	Initiation Decision Report
LURSOT	Laser Ultrasonic Remote Sensing of Oil Thickness
NAVFAC	Naval Facilities Engineering Command
NMCI	Navy Marine Corps Intranet
NOAA	National Oceanic and Atmospheric Administration
NOSC	Navy On-Scene Coordinator
NSWCCD	Naval Surface Warfare Command Carderock Division
OPNAV	Office of the Chief of Naval Operations
OREIS	Oak Ridge Environmental Information System
PAA	Pollution Abatement Ashore
PISCES	Potential Incident Simulation Control and Evaluation System
ROC	Regional Operation Center
SLEAF	Scanning Laser Environmental Airborne Fluorosensor
SONS	Spill of National Significance
SOSC	State On-Scene Coordinator
SSC San Diego	Space and Naval Warfare Systems Center San Diego
SUPSALV	Supervisor of Salvage and Diving
USCG	United States Coast Guard

INTRODUCTION

This Initiation Decision Report (IDR) describes a review and prioritization of potential technologies that could be used to reduce response costs and environmental damage from accidental spills of oil into the aquatic environment. The report was requested by the Naval Facilities Engineering Command (NAVFAC) Pollution Abatement Ashore (PAA) Program in response to a need submitted by the Navy oil spill user community to improve the management of oil spill response by more quickly detecting and responding to spills on water (PAA Need N-0404-06). The spill response community is concerned because oil spreads very quickly on water, and impacts to natural resources and the costs to recover and mitigate those impacts also rapidly increase with time. Implementing technologies that can reduce the time of detection and response, therefore, would provide significant benefit by reducing costs and impacts to the environment and a better public image. The report evaluates technologies within six broad categories:

1. **Prevent**: Technologies useful in preventing spills.
2. **Sense**: Technologies useful in sensing oil to either notify of an initial leak or spill or monitor and track the evolution of a spill.
3. **Assess**: Problem-solving technologies used to guide response team efforts to accurately assess and predict spill status, including extent, magnitude, and trajectory.
4. **Coordinate**: Technologies to facilitate coordination of spill response among responders, including a Common Operational Picture (COP), situational awareness, communications, command and control tools, and information management.
5. **Recover**: Technologies used for oil spill cleanup and recovery efforts.
6. **Support**: Other technologies that support the response effort.

Navy On-Scene Coordinators (NOSCs) identified candidate technologies within each category through the PAA Need Identification process and direct solicitation. The technologies were also identified indirectly through conversations with NOSCs and other Navy responders such as Supervisor of Salvage and Diving (SUPSALV) as well as non-Navy spill responders such as the United States Coast Guard (USCG), the National Oceanic and Atmospheric Administration (NOAA), and spill contractors contacted during spill drills, exercises, and conferences. Potential technology ideas were also identified by SPAWAR Systems Center San Diego (SSC San Diego) technologists after reviewing recent literature and the Internet.

Technology ideas were compiled into a matrix that was sent out to each of the regional NOSCs so they could prioritize them in meeting their needs. The prioritized matrix was sent along within a draft of this report to allow a final evaluation by the NOSCs before producing this final report. The following sections describe the background, approach, and methods used to derive the final prioritized list of technology needs and include a discussion of possible solutions to meet them. The appendices (see supplied CD) include the original Navy need, NOSC communications via emails and notes taken during phone conversations, the original technology matrix used to develop the survey, the technology matrix sent to the NOSCs, notes taken at spill drills and exercises, conference notes, a bibliography, and an annotated listing of Internet search results.

BACKGROUND

The Navy is required to have an oil and hazardous substance pollution contingency plan in place to respond to spills originating from Navy facilities and vessels, as identified in Office of the Chief of Naval Operations (OPNAV) Instruction 5090.1B (Chapter 10) in compliance with the Clean Water Act (40 Code of Federal Regulations Part 300). As part of compliance with these requirements, the Navy has developed plans, staged response equipment, and trained personnel in each Navy region to respond to spills. These requirements are met by the Navy regional organizations under direction of Commander Navy Installations Command (CNIC).

Five CNIC regional shore commands in the continental United States have responsibility for oil spill response (Figure 1-1). An additional seven CNIC regions outside the continental United States have responsibility for spill response (Figure 2). In addition, three fleet commands have areas of responsibility (AORs) outside those of the shore commands. However, current plans call for a realignment of fleet spill responsibilities into the shore regional commands, thus expanding their AORs.

Spill response in each region is headed up by the NOSC, who is the Navy official pre-designated to coordinate Navy oil and hazardous substance spill contingency planning and direct spill response efforts in a pre-assigned area. Though all regions meet OPNAV requirements, each region is run somewhat autonomously and uniquely with regards to how it meets its spill response requirements. Each region has differences in command structure, the number and size of facilities and port operations, the number of trained spill response personnel, differences in funding priorities, relationships with other federal and state responders, and available vendors and contract mechanisms. These differences potentially lead to variations in the type of technology needs each NOSC has or perceives. Regional differences potentially complicate the implementation of new technologies.

The Navy's current response to small on-water spills (subjectively <1000 gallons) are typically handled very quickly using Navy personnel and internal, pre-staged Navy recovery resources such as boats, booms, skimmers, absorbent pads, etc. However, response to medium to large oil (or hazardous material) spills, spills that take days to clean up, is conducted using the Incident Command System (ICS), an emergency response management system that provides a scalable, standardized emergency response framework. The ICS is designed to facilitate a multi-agency, multi-resource recovery of spilled oil in a cost-efficient manner that minimizes impacts to environmental and commercial resources.

Initiation of the ICS by the NOSC allows the Navy to bring in a whole range of response resources that are not available to it alone. The ICS is headed up by a Unified Command that consists of the NOSC; the Federal On-Scene Coordinator (FOSC), which for on-water spills is the USCG; and a State On-Scene Coordinator (SOSC). Personnel working within the ICS come from multiple Navy commands, including the following:

- CNIC
- NAVFAC
- Fleet Forces Command
- SUPSALV and their contractors
- Multiple Federal agencies such as the Environmental Protection Agency, U.S. Fish and Wildlife, USCG, NOAA, and state and local agencies that vary by state, county, and city

In addition to personnel, these various agencies may provide a large range of response capabilities to sense assess, and coordinate the response, including the following technologies:

- Aircraft imaging
- Geographic Information Systems (GIS) information
- Spill trajectory models
- Networked computers
- Radio communication systems
- Sampling systems
- Recovery assets such as additional booms, skimmers, boats, and trucks

Though spills are infrequent and are usually small and cleaned up quickly, the Navy must be prepared to respond to all spills, even the exceptionally rare worst case spills. To be prepared for these worst case spills, the NOSCs perform training and drills using the ICS and include as many outside resource agencies as possible to ensure that they learn to work together efficiently. Drills and training are also supported by contractors who provide spill scenario design, spill trajectory simulations, and evaluations.

The level of effort involved in drills in terms of personnel can be very high, though many technology resources from outside agencies are not utilized during drills because of cost or because the logistics are not reasonable for a 1- or 2-day effort. Thus, many of the potential technologies used for spill response are not implemented within the ICS until an actual spill occurs. Reliance on other agencies to bring in resources complicates the Navy's strategy to invest in technology advances. The reason for this complication is that the Navy can afford to do nothing and yet potentially benefit from the outside community's active testing and development of new technologies. However, in some instances, getting these technologies to the ICS sooner than might occur through interagency actions could provide the Navy with a quicker response action.

Instances may also exist where outside agency ownership limits interoperability, and thus limits a technology's usefulness (e.g., California's Office of Spill Prevention and Response GIS). In some situations, the available technology may have been developed to a certain level of capability under particular circumstances but could be improved to obtain a more accurate outcome in critical situations (e.g., spill trajectory modeling in Navy harbors). Though the non-Navy community is actively pursuing new technology, other useful ideas (e.g., spill tracking at night) may exist that it cannot pursue because of limited budgets, inadequate technical expertise, or other reasons.

There are other inherent obstacles to technology, development, and implementation in the spill arena. The fact that the ICS was developed to be a manual, paper-intensive process (developed to support backcountry firefighting conditions), typically without access to real-time situational awareness, can be a potential stumbling block to effective response. These limitations, coupled with the restrictions on connectivity and software use under the Navy Marine Corps Intranet (NMCI), pose obstacles for the ICS that commonly forms up at a Navy facility (for Navy spills).

Finally, some spill responders have an underlying apprehension that technology will not measurably improve the response process because of the infrequency and small size of spills. These obstacles need to be understood when evaluating whether new technologies can potentially provide a response that is quicker, more effective, more accurate, more productive, or more interoperable.

Figure 1. Map showing five Navy regions within the continental United States.
(Graphic obtained from CNIC Website, August 2007.)

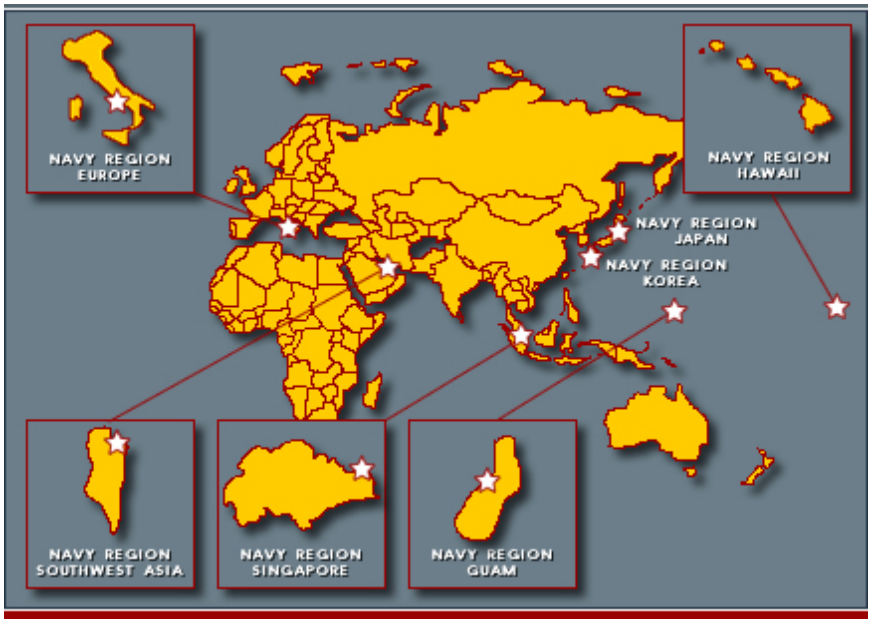

Figure 2. Map showing seven Navy regions outside the continental United States.
(Graphic obtained from CNIC Website, August 2007.)

METHODS

The ultimate goal of this IDR is to provide the PAA Program with a roadmap for making future technology investments that will provide the Navy spill response community with tools or techniques that enhance its capability to mitigate environmental damage and costs. To meet this goal, it was critical to obtain end-user NOSC input to identify their various needs, perceived technology gaps, and ideas on possible solutions as well as to understand the conditions under which they operate.

The approach was to acquire their input through direct solicitation via email and phone calls, by attending spill drills and training exercises, and through informal conversations at drills and exercises. Important input from the spill community at-large was primarily obtained during formal drill debriefings and informal communications conducted at drills and training exercises. Additionally, the approach included reviewing the literature and the Internet to identify information on past and current technology development efforts.

NOSC and spill community input on needs, gaps, and solutions was obtained during the following activities (in chronological order):

- Oil Spill Modeling Demo and Needs discussion with NOSC at Commander Navy Region Southwest (CNRSW)
- Solicitation of needs and ideas during initial PAA "needs" process
- Participated in CNRSW spill drill
- Direct solicitation of needs and ideas via email communications
- Participated in U.S.–Mexico Cooperative Oil Spill Ecological Risk Assessment Workshop
- Solicitation of planned NOSC spill drills and exercises via email and phone calls
- Observed Commander Navy Region Hawaii (CNRHI) Worst Case Discharge Spill Drill
- Attended NOAA/University of New Hampshire Coastal Response Research Center Workshop
- Started literature and Internet review
- Participated in USCG National Preparedness for Response Tabletop Exercise Symposium with CNRSW
- Observed and participated in Field Deployment and Tabletop Exercise at CNRSW
- Observed Spill of National Significance (SONS) 2007 Full-Scale Exercise at Commander Navy Region Midwest (CNRMW)
- Direct solicitation of NOSCs for technology priority ranking by email and phone calls
- Direct solicitation of NOSCs for review of priority ranking and of draft IDR

The input described above (see Appendix G on the supplied CD) was used to generate a technology matrix (see Appendix H on the supplied CD) that was divided into six broad categories identified earlier: Prevent, Sense, Assess, Coordinate, Recover, and Support. The matrix was put together using all input, though some of the technology needs or solutions overlapped. The source of a technology idea was identified in the matrix. In many cases, SSC San Diego is listed as a source of an idea, though the ultimate source may have actually come through discussions with other personnel at a drill or other activity. The technology matrix was sent to the NOSC community for ranking. NOSCs were also asked to provide additional ideas. Phone and email was widely used to prompt all NOSCs to provide input to the rankings.

The NOSCs were asked to rank technologies within each of the six categories. The plan was to have technologies within each category ranked with a distinct number from 1 (highest priority) to n (lowest priority), where n = total number of technologies in a category. However, most of the NOSCs ranked them using a scheme of 1 (highest) to 5 (lowest) with priority levels often used

repeatedly within the same category, thus requiring normalization of the rankings. All rankings were therefore normalized to the latter approach using values of 1 through 5 with multiple assignments. A qualitative approach to these rankings can be viewed as very high (1), high (2), medium (3), low (4), and very low (5). In a few instances, a NOSC did not rank an item or identified it as non-applicable. In both cases, the item was identified with a "NR" for "not ranked," and the average was calculated without a value for that NOSC.

The following appendices to this document (see supplied CD) include all of the raw communications, comments, and technology matrix information gathered during the project:

- Appendix A: PAA Navy Need
- Appendix B: NOSC Communications
- Appendix C: Spill Drill Notes
- Appendix D: Calls, Meetings, and Conference Notes
- Appendix E: Web Technology Search Spreadsheet
- Appendix F: Web Technology Abstracts
- Appendix G: Technology Matrix Input Compilation Spreadsheet
- Appendix H: NOSC Technology Matrix Survey Spreadsheet

RESULTS

All five of the CNIC regional shore NOSCs in the continental United States responded to the technology rankings request. However, the NOSC from CNRSW did not actually rank technologies, instead stating that "any one or two of these would not likely result in any significant improvement." Only one of the NOSCs from outside the continental United States, CNRHI, responded to the ranking request. Therefore, the rankings are based on five NOSC inputs.

Results of the rankings are shown in a table for each category. The results tables show the individual NOSC rankings, average rankings, the technology idea, and the source of the initial input to the matrix. The tables are sorted in ascending order on the basis of average rank value, with the highest priority (i.e., smallest number) ranked at the top. The text in the results tables shown in this section were modified slightly from the original tables sent to the NOSCs for ease of reading. The original table matrix can be found in Appendix H (see supplied CD). The following subsections describe the results of the technology ranking effort.

PREVENT

Initial Inputs

This category included physical structures such as booms and other barriers that when temporarily deployed would prevent the spread of oil across water bodies. It included needs such as integrating oil booms into existing security booms used at bases and improving boom maintenance requirements by reducing fouling (PAA Need N-0110-02). It also included technologies that could be incorporated into existing oil storage or transfer infrastructure to prevent an initial release or provide very early detection, alerting, and response/mitigation so that the amount spilled is minimal. This category included a technology idea for using radio-tagging of fuel transfer piping equipment (PAA Need N-0488-07). It also included looking for a method that could alter water body flow during critical times (e.g., refueling, recovery operations) to minimize or prevent further dispersion. Five prevention technologies were initially identified in this category.

NOSC Rankings

The NOSC rankings under the Prevent category are shown in Table 1. The average rankings ranged from a priority of 2.0 to 3.8 out of 5. The highest priority technology need was to integrate an oil spill containment capability into facility security barriers. Two of the NOSCs rated this item as a very high priority. The lowest priority ranking was for devices that could be used to temporarily slow down currents during refueling operations. One NOSC ranked these devices a very high priority, whereas the others ranked it low and very low. This outcome indicates how specific regional needs and differences affect the rankings.

Comments accompanying the rankings provided some insight into the rankings. For instance, the need for a temporary device to slow currents was generated at Commander Navy Region Southeast (CNRSE) as a result of a specific harbor setting. Anti-fouling booms were called out as particularly useful in Pearl Harbor because of high marine organism growth rates. The NOSC at Commander Navy Region Mid-Atlantic (CNRMA) reasoned that applying technology devices to the fueling, de-fueling, and internal transfer process would reduce the need for sensing technologies. The NOSC from Commander Navy Region Northwest (CNRNW) believed that current manual checklists worked well, whereas the cost and maintenance of added technology might be prohibitive.

Table 1. Ranked technology ideas in the Prevent category.

CNRHI	CNRMA	CNRMW	SNRSE	CNRNW	Average	Idea	Source
2	1	3	1	3	2.00	Spill containment capability added to security booms	CNRSE, CNRMA
2	3	2	3	1	2.20	Improved boom technologies—reduced fouling	PAA-NSWCCD-Hasselbeck
2	1	5	2	4	2.80	Oil transfer spill prevention using radio frequency identification-tagged equipment	PAA-NSWCCD-Harasti
2	4	1	5	5	3.40	Temporary devices to protect sensitive areas	CNRSE
4	5	4	4	2	3.80	Temporary devices to slow currents during refueling	CNRSE

Legend
NSWCCD: Naval Surface Warfare Center Carderock Division

SENSE

Initial Inputs

The Sense category included technology ideas for oil detection and monitoring sensors that could be used to alert personnel at the initiation of a leak or spill or to monitor and track the evolution of the spill, including its dispersion and thickness. It also included tools to sense meteorological and oceanographic conditions that affect spill dispersion. The Sense category had 18 technology ideas listed, the most in any category. Several technologies had overlap in their capability (e.g., different sensors to fingerprint oil type or determine oil thickness), and several ideas specified the manner in which the sensing capability could be implemented (e.g., integrated into existing oil transfer infrastructure, deployed on oil booming equipment, placed into the water, or flown on an aerial vehicle). These are the reasons for the large number of technology ideas listed in this category. Technologies included video, infrared/thermal, ultraviolet, fluorescence, multi-spectral, microwave, and acoustic detectors.

Some common threads in the NOSC input included using sensors to alert them to a spill and to track its spatial extent and thickness, particularly at night or in poor visibility conditions. Several NOSCs identified spill thickness as an important parameter to provide better estimation of spilled volume as well as to identify where recovery efforts should be focused. Using sensors such as video capture to gain real-time situational awareness in the command center was also a common interest. The need for better situational awareness maps and data was identified during each of the spill drills attended.

NOSC Rankings

The NOSC rankings under the Sense category are shown in Table 2. The average rankings ranged from a priority of 1.8 to 3.8 out of 5. The highest priority technology need was to improve oil spill assessment capabilities to locate and track spill extent and thickness, especially in reduced visibility conditions. Three of the NOSCs rated this item as a very high priority. Two of the next four highest ranked technologies also related to detecting and tracking spills, whereas the other two identified a need for real-time visual data streaming to the Command Center with handheld devices or devices installed on an unmanned aerial vehicle.

Interestingly, the two ideas ranked at the bottom were also spill-tracking and oil thickness technologies, but in those cases, a specific type of sensor was identified in the idea. This information suggests that the NOSCs want better spill tracking capabilities but know or surmise that specific sensors do not work well or that they would be too difficult to implement (buy, maintain, use). Another potential reason is that the NOSCs may have been reluctant to prematurely select specific vendors or products to fill their capability gaps without having detailed information on analytical comparisons. Two spill alerting technologies were ranked near the bottom of the priority list (3.2 and 3.4), suggesting that the NOSCs believe they have a generally good ability to detect the early stages of a spill or believe that the technologies available are not cost effective or reliable.

Table 2. Ranked technology ideas in the Sense category.

CNRHI	CNRMA	CNRMW	SNRSE	CNRNW	Average	Idea	Source
1	4	1	2	1	1.80	Improved oil spill assessment capabilities to locate and track spill extent and thickness, especially in reduced visibility conditions	CNRNW
1	5	1	2	2	2.20	Sensors deployed on free-floating drifers to track spill	SSC San Diego
1	5	NR	2	1	2.25	Unmanned aerial vehicle with cameras	CNRHI
1	1	4	2	4	2.40	Real-time streaming photos, audio, and video by cell phone linked to command center	CNRSW, SSC San Diego
3	5	1	2	1	2.40	Airborne sensor to detect oil spill boundaries	CNRNW
1	4	5	1	2	2.60	Improved field portable oil identification/fingerprint tool	CNRNW
2	5	2	2	2	2.60	Nighttime oil tracking pads with reflective coating floats with oil, reflective, or has small flashing light	CNRNW
4	1	3	3	3	2.80	Wave Current Information System real-time wave, water level, and velocity, and meteorological data system with online feed	SSC San Diego
4	2	4	2	2	2.80	Use of existing security infrastructure (radars, cameras) for oil spill sensing and tracking	SSC San Diego
2	5	1	2	5	3.00	Devices to measure oil thickness	SSC San Diego
3	5	2	2	3	3.00	High-frequency radar systems for real-time, current data	SSC San Diego
2	5	3	2	3	3.00	Aerial multi-spectral imaging to track spill thickness	SSC San Diego
3	5	3	2	3	3.20	Portable ultraviolet lights for spill alerting and tracking	CNRNW
3	5	NR	1	4	3.25	Oil spill identification system using microwave radiometer and radar unit	SSC San Diego
3	5	2	2	5	3.40	Alert sensors integrated into booms or security systems	CNRSE
3	5	2	2	5	3.40	Underwater ultraviolet fluorescence spill detection (e.g., SSC San Diego's system)	SSC San Diego
4	5	4	2	3	3.60	Airborne oil spill sensors such as LURSOT and SLEAF to detect thickness and oil along shorelines	SSC San Diego
3	5	5	2	4	3.80	OSIS microwave network to track oil surface area and thickness with data fed to command center visualization	SSC San Diego

Legend
NR: item ranked.

ASSESS

Initial Inputs

The Assess category included problem-solving tools that would allow response teams to accurately evaluate current spill status and predict future spill status. The category mostly consisted of software tools for improving predictions for spill trajectories, including the ability to take into account real-time data streams that provide "nowcasting" capability. Software models such as the General NOAA Operational Modeling Environment (GNOME) model and Potential Incident Simulation Control and Evaluations System (PISCES II) were also specifically named. Two issues commonly cited for better modeling capability were the inability to use current models on NMCI computers and poor predictions, particularly noted for Pearl Harbor.

The list also included field portable tools to assess fuel evaporation rates, given actual field conditions. A hazardous material response information database—Oak Ridge Environmental Information System (OREIS)—was also identified for use in the field to help responders assess the potential hazards from spills of oil or hazardous materials. Seven ideas were identified in this category.

NOSC Rankings

The NOSC rankings under the Assess category are shown in Table 3. The average rankings ranged from a priority of 1.2 to 2.6. Similar to the Sense category rankings, the highest priority technology was the most general need identified, in this case, an improved predictive modeling/nowcasting tool. This general need was the highest ranked item in any of the categories, ranked very high by four of the five NOSCs. Specifically named models were ranked further down the list. The OREIS database tool was ranked near the bottom of this list, with the evaporation rate tool rated the lowest.

Table 3. Ranked technology ideas in the Assess category.

CNRHI	CNRMA	CNRMW	SNRSE	CNRNW	Average	Idea	Source
1	1	1	2	1	1.20	Improved predictive modeling/nowcasting of spills	CNRSW, SSC San Diego
1	1	3	2	2	1.80	Handheld modeling tool	CNRNW
1	1	3	1	4	2.00	PISCES2 spill trajectory simulation model	CNRMA, CNRSW
1	3	3	2	1	2.00	Access to GNOME oil spill model used by NOAA	CNRSW
1	2	5	2	1	2.20	Better oil spill modeling for Pearl Harbor (also for *USS Arizona* seepage)	CNRHI
1	2	4	2	3	2.40	Handheld/pocket database tools such as OREIS for hazardous materials look-up	SSC San Diego
1	5	2	3	2	2.60	Portable meter for predicting spill evaporation rates	CNRNW

COORDINATE

Initial Inputs

This technology category identified ideas and tools for providing improved situational awareness, information flow, and data sharing amongst responders within the ICS operations center. Potential technologies included wireless networks, visualization equipment, electronic forms, communication links across command centers, response equipment tracking, vessel tracking, Web-accessible sensors management software, and database tools for Area Contingency Plans (ACPs). Many of the inputs to this category were made by SSC San Diego as a result of discussions with personnel during spill drills conducted within the ICS.

The ICS is particularly ripe for technology improvement because of its historical reliance on manual, paper-intensive techniques that are not subject to problems such as power failures. Thus, technology investment in ICS-related coordination tools would likely be accepted only after an item or system has been well-tested and is sufficiently robust. A common concern brought up during drills was the issue of having limited or poor situational awareness. For example, this issue was mentioned in the "hot-wash" debriefing held after the SONS exercise, and was partially attributed to the inability of NMCI to support either ad hoc network sharing of exercise information or installation of any non-NMCI software applications brought to the Navy command center for ICS coordination and situational awareness. Sixteen technology ideas were ranked in this category.

NOSC Rankings

The NOSC rankings under the Coordinate category are shown in Table 4. The average rankings ranged from a priority of 1.4 to 3.25. The highest priority item in the category and the second highest ranking overall was the idea to have a "spill kit" consisting of a group of laptops with preloaded software and common electronic forms and documents that can be networked on-site along with hardware and software to fax and print pertinent documents. This technology was ranked a very high priority by four of the five NOSCs.

The next three highest technology ideas (average rank of 1.8) included a Web-accessible information system to aggregate multiple data sources (sensor, model, real-time), a system to track response resources (e.g., Genwest's E-card system), and a capability to complete ICS forms electronically and remotely. This last item, when associated with a specific technology (ExpeData™ digital pen) was ranked lower (2.0), again following the trend that NOSCs ranked generic capabilities higher than ones that had a specific vendor or product included in the description.

The next nine technologies in ranked order (2.0 to 2.4) spanned ideas such as linking command centers, incident management software, tracking response vessels, tools or software for better situational awareness, and speeding up information flow. This group also included some overlap with ideas that were ranked highest, such as the "spill kit" and electronic ICS form technologies. The three technologies ranked at the bottom (2.75 to 3.40) were sensor integration into response management tools, having a central data repository for items such as the ACP, and linking of response efforts with harbor security efforts.

Table 4. Ranked technology ideas in the Coordinate category.

CNRHI	CNRMA	CNRMW	SNRSE	CNRNW	Average	Idea	Source
1	1	1	1	3	1.40	Spill kit (laptops, network system, forms, common software, hardcopy, fax capability	SSC San Diego
1	1	NR	2	3	1.75	Web-accessible information system to aggregate multiple data sources (sensor, model, real-time)	SSC San Diego
1	4	NR	1	1	1.75	Genwest E-Card for tracking resources in response	CNRHI
2	1	3	1	2	1.80	Capability to compete ICS forms electronically and remotely (field) and transmit to ICS	CNRMA
1	1	2	1	5	2.00	Software and projector for situational awareness	SSC San Diego
1	3	1	1	4	2.00	Incident Management System Software: AIMSonScene™ SU	SSC San Diego
1	1	NR	1	5	2.00	Digital paper and pen system and wireless transfer for ICS (and other) forms using ExpeData™ digital pens	CNRSW, SSC San Diego
2	3	2	2	1	2.00	COP of response assets using AIS transponders, Blue Force Tracker, other	CNRNW
1	1	4	2	3	2.20	Linking command centers for oil spill response	SSC San Diego
2	3	NR	1	3	2.25	Portable electronic tools to speed up information flow	CNRNW
1	1	4	2	4	2.40	Situational awareness maps and COP using non-NMCI computers, PC tablet with wireless transmission back to ICS	CNRHI
1	1	5	1	4	2.40	Internet-based monitoring and reporting for situational awareness	CNRMA
2	1	5	1	3	2.40	Wireless hotspot for connecting multiple information sources/recipients together	SSC San Diego
2	5	NR	2	2	2.75	Integrating sensor data into response management and coordination tools	SSC San Diego
4	4	3	3	2	3.20	Central data repository for ACP and related information	SSC San Diego
4	3	3	2	5	3.40	Tools linking response efforts with harbor security monitoring	CNRSW, SSC San Diego

Legend
NR: item not ranked.

RECOVER

Initial Inputs

Technologies in the Recover category included improvements to tools currently available for collecting oil from water surfaces and additional tools for cleaning and spill remediation. The five technology improvements included improved skimming devices, improved absorbent pads, supplementary skimming capability for work boats, improved surface designs for skimming drums, and spill remediation using biological systems.

NOSC Rankings

The NOSC rankings under the Recover category are shown in Table 5. The rankings ranged from 1.8 to 4.0, the widest range in any of the categories. The highest ranked idea was improved skimming technologies, again following the NOSC trend of favoring the general capabilities over specific ones. The next three priority ideas were, in order, an improved oil absorbent pad, tailored surfaces to improve skimming, and a supplementary oil skimmer device for work boats. The lowest ranked item in the category and overall was spill bioremediation.

SUPPORTING EQUIPMENT/TECHNOLOGIES

Though the survey had two technology ideas identified, they both identified the need for improved portable lighting systems to support a variety of response activities in the field. These were both ranked similarly (1.8) and are shown in the last row of Table 5.

Table 5. Ranked technology ideas in the Recover category and Support category (last row of table).

CNRHI	CNRMA	CNRMW	SNRSE	CNRNW	Average	Idea	Source
2	3	2	1	1	1.80	Improved skimming technologies	CNIC
1	3	1	2	4	2.20	Improved oil absorbent pad	CNRNW
2	4	4	1	2	2.60	Tailored surfaces in oleophilic skimmers	SSC San Diego
3	2	5	1	3	2.80	Supplementary oil skimmer device for work boat	CNRNW
4	4	3	4	5	4.00	Spill bioremediation	SSC San Diego
2	4	1	1	1	1.80	Lighting systems	CINC, CNRNW

ADDITIONS TO THE RANKED TECHNOLOGY MATRIX

The NOSCs were asked to provide additional ideas, comments, or feedback when performing the technology survey rankings. One new idea that came out of this review included additional training, modeling, or sensors that could be used in the NOSCs' recently expanded AOR that now extends 12 miles offshore. Several NOSCs had concerns about how to expand their capabilities to respond in their new larger AOR. Expanding the response to farther offshore may, at a minimum, require that the Navy consider these extended distances for response when choosing new oil spill technologies, and may even need to develop additional unidentified technology solutions.

Another issue of concern that came up during NOSC email communications, but after the matrix was already ranked, was the use of models to determine exposures and associated health risks of Navy spills to responders, which would identify when personal protection equipment would be required (CNRSW). It is impossible to rank this item after-the-fact, but because it is related to a human health risk, should be considered further for investment by the PAA Program.

OVERALL RANKINGS

While technologies were ranked within each of the six categories, they can also be ranked over the full matrix of 52 technologies. This ranking was accomplished in two ways. The first method was to rank all technologies on the basis of their numeric score given by the average NOSC ranking. This method simply pools the results discussed above from all the tables. The second method ranked the technologies in a manner that counted the number of very high (1), high (2), medium (3), and low or very low (4 and 5 together) rankings given to each technology. This second method placed more importance on the individual ranking data rather than on the average score.

Specifically, the individual rankings were sorted and then ranked based on the number of individual rankings of 1, then 2, then 3, and so on. When a technology was rated a 1 by three or four NOSCs, the final ranking was 1. When a technology was rated a 1 by two NOSCs, the final ranking was 2. When a technology was ranked a 1 by only one NOSC, the final ranking was 3. When a technology was not ranked a 1 by any NOSC, the final ranking was 4. The reasons for evaluating the data both ways was because the small number of NOSCs responding limited the numeric resolution of the average scores and the individual rankings of each NOSC's top priorities may be important, particularly when it comes to implementation.

The overall ranking table based on average numeric score is shown in Table 6. The rankings, after rounding to the nearest integer value, were color-coded (1 = green, 2 = blue, 3 = yellow, and 4 = red (none of the rankings averaged 5) for visual differentiation. Technologies with the same numeric score were placed into the table in no particular order. The overall ranking by individual ranks is shown in Table 7. Each NOSC ranking and the overall rank based on how many 1's, 2's, etc. were given to a technology are shown in the table. These overall ranks were color-coded similarly to Table 6. The overall rankings based on average numeric values are also shown in the table for comparison. The color coding was used to visually differentiate the scores.

Though there were some differences in how the two ranking methods categorized the overall data, both methods showed two technologies with a very high priority ranking. These included improved predictive trajectory modeling/nowcasting and "spill kits" that would provide a networked computer hardware and software infrastructure appropriate for working within the ICS. Numerically these technologies had an average rank of 1.2 and 1.4, respectively, and were the only technologies that were ranked a priority of 1 by four of five NOSCs. These two technologies comprise the top tier of technology needs identified by the NOSCs.

Twenty-seven technologies had an average numeric ranking, when rounded, with a high priority ranking (2). More than half (15) of these were ranked the same by both ranking methods. The remainder included eight that ranked higher with an overall priority ranking of 1 and four that ranked lower with a priority ranking of 3. One technology (improved field portable oil identification/ fingerprinting tool) was ranked lower (3) using the average numerical score rather than the individual ranking method (2). There were also some differences between the two methods at the lower end of the scale, but because the focus of the IDR is to identify the most needed technologies, these were not further evaluated or discussed.

The following eight technologies were ranked very high priority (1) using the individual method and a high priority (2) using the numerical average method:

- Improved plume tracking and thickness assessment capability
- Lighting systems
- Two situational awareness items, including a projector and software system or Internet-based tools
- PISCES2 spill trajectory modeling capability
- Two management systems, one for tracking response equipment (Genwest E-Card), and one to provide command management (AIMSonScene™)
- Two technologies for filling out and sending ICS forms digitally. These eight technologies comprise the second tier of technology needs identified by the NOSCs

The next tier of rankings in which both ranking methods prioritized the technologies as high priority (2) included the following:

- Capability to complete ICS forms electronically and remotely
- Handheld modeling tool
- Improved skimming technologies
- Sensors deployed on free-floating drifters
- Better oil spill modeling for Pearl Harbor
- Web-accessible information system
- Spill containment capability added to security booms
- Access to NOAA's GNOME oil spill model
- Linking command centers
- Improved oil absorbent pad
- Airborne sensor to detect oil spill boundaries
- Wireless hotspot for connecting multiple information sources/recipients together
- Unmanned aerial vehicle with cameras
- Real-time video streaming to the Command Center
- Situational awareness maps and COP using non-NMCI computers

These 15 technologies comprise a third tier of technology needs identified by the NOSCs, although some technologies overlap with higher ranked items.

Table 6. Overall rankings based on average numeric scores.

AVG RANK	TECHNOLOGY IDEA
1.20	Improved predictive modeling/nowcasting of spills
1.40	Spill kit-laptops, networked system, forms, common software, hardcopy, fax capability
1.75	Web-accessible information system to aggregate multiple data sources (sensor, model, real-time)
1.75	GENWEST E-Card for tracking resources in response
1.80	Improved oil spill assessment capabilities to locate and track spill extent and thickness, especially in reduced visibility conditions
1.80	Hand-held modeling tool
1.80	Capability to complete ICS forms electronically and remotely (field) and transmit to ICS
1.80	Improved skimming technologies
1.80	Lighting systems
2.00	Spill containment capability added to security booms
2.00	PISCES2 spill trajectory simulation model
2.00	Access to GNOME oil spill model used by NOAA
2.00	Software & projector for situational awareness
2.00	Incident Management System Software: AIMSonScene SU
2.00	Digital paper and pen system and wireless transfer for ICS (and other) forms using ExpeData digital pens
2.00	Common Operational Picture of response assets using AIS transponders, Blue Force Tracker, other
2.20	Improved boom technologies-reduced fouling
2.20	Sensors deployed on free-floating drifters to track spill
2.20	Better oil spill modeling for Pearl Harbor (also for Arizona seepage)
2.20	Linking command centers for oil spill response
2.20	Improved oil absorbent pad
2.25	Unmanned aerial vehicle with cameras
2.25	Portable electronic tools to speed up information flow
2.40	Real-time streaming photos, audio and video by cell phone linked to Command Center
2.40	Airborne sensor to detect oil spill boundaries
2.40	Handheld/pocket database tools such as OREIS for hazmat lookup
2.40	Situational awareness maps and common operation picture using non-NMCI computers, PC tablet, with wireless transfer back to ICS
2.40	Internet-based monitoring and reporting for situational awareness
2.40	Wireless hotpsot for connecting multiple information sources/recipients together
2.60	Improved field portable oil identification/fingerprinting tool
2.60	Nighttime oil tracking pads with reflective coating floats with oil, reflective or has small flashing light
2.60	Portable meter for predicting spill evaporation rates
2.60	Tailored surfaces in oleophilic skimmers
2.75	Integrating sensor data into response management & coordination tools
2.80	Oil transfer spill prevention using Radio Frequencey Identification tagged equipment
2.80	Wave Current Information System (WAVCIS) real-time wave, water level and velocity, and meteorological data system with online feed
2.80	Use of existing security infrastructure (radars, cameras) for oil spill sensing and tracking
2.80	Supplementary oil skimmer device for work boat
3.00	Devices to measure oil thickness
3.00	High Frequency radar systems for real-time current data
3.00	Aerial multispectral imaging to track spill thickness
3.20	Central data repository for Area Contingency Plan and related information
3.20	Portable ultra-violet lights for spill alerting and tracking
3.25	Oil spill identification system using microwave radiometer and radar unit
3.40	Tools linking response efforts with harbor security monitoring
3.40	Temporary devices to protect sensitive areas
3.40	Alert sensors integrated into booms or security systems
3.40	Underwater ultraviolet fluorescence spill detection (e.g., SSC San Diego's system)
3.60	Airborne oil spill sensors such as LURSOT and SLEAF to detect thickness and oil along shorelines
3.80	Temporary devices to slow currents during refueling
3.80	Online Environmental Surveillance microwave network (OSIS) to track oil surface area and thicknesswith data fed to command center visualization
4.00	Spill bioremediation

Color codes visually differentiate numeric scores into the four priority levels after rounding the scores to the nearest integer value.

Table 7. Overall rankings based on the number of individual NOSC rankings.

Individual Rank	Individual Rank	Individual Rank	Individual Rank	Individual Rank	Overal Ranking Individual	Overal Ranking Average	TECHNOLOGY IDEA
1	1	1	1	2	1	1.2	Improved predictive modeling/nowcasting of spills
1	1	1	1	3	1	1.4	Spill kit-laptops, networked system, forms, common software, hardcopy, fax capability
1	1	1	2	4	1	1.8	Improved oil spill assessment capabilities to locate and track spill extent and thickness, especially in reduced visibility conditions
1	1	1	2	4	1	1.8	Lighting systems
1	1	1	2	5	1	2.0	Software & projector for situational awareness
1	1	1	3	4	1	2.0	PISCES2 spill trajectory simulation model
1	1	1	3	4	1	2.0	Incident Management System Software: AIMSonScene SU
1	1	1	4	NR	1	1.8	GENWEST E-Card for tracking resources in response
1	1	1	4	5	1	2.4	Internet-based monitoring and reporting for situational awareness
1	1	1	5	NR	1	2.0	Digital paper and pen system and wireless transfer for ICS (and other) forms using ExpeData digital pens
1	1	2	2	3	2	1.8	Capability to complete ICS forms electronically and remotely (field) and transmit to ICS
1	1	2	2	3	2	1.8	Hand-held modeling tool
1	1	2	2	3	2	1.8	Improved skimming technologies
1	1	2	2	5	2	2.2	Sensors deployed on free-floating drifters to track spill
1	1	2	2	5	2	2.2	Better oil spill modeling for Pearl Harbor (also for Arizona seepage)
1	1	2	3	NR	2	1.8	Web-accessible information system to aggregate multiple data sources (sensor, model, real-time)
1	1	2	3	3	2	2.0	Spill containment capability added to security booms
1	1	2	3	3	2	2.0	Access to GNOME oil spill model used by NOAA
1	1	2	3	4	2	2.2	Linking command centers for oil spill response
1	1	2	3	4	2	2.2	Improved oil absorbent pad
1	1	2	3	5	2	2.4	Airborne sensor to detect oil spill boundaries
1	1	2	3	5	2	2.4	Wireless hotpsot for connecting multiple information sources/recipients together
1	1	2	5	NR	2	2.3	Unmanned aerial vehicle with cameras
1	1	2	4	4	2	2.4	Real-time streaming photos, audio and video by cell phone linked to Command Center
1	1	2	4	4	2	2.4	Situational awareness maps and common operation picture using non-NMCI computers, PC tablet, with wireless transfer back to ICS
1	1	2	4	5	2	2.6	Improved field portable oil identification/fingerprinting tool
1	2	2	2	3	3	2.0	Common Operational Picture of response assets using AIS transponders, Blue Force Tracker, other.
1	2	2	3	3	3	2.2	Improved boom technologies-reduced fouling
1	2	2	3	4	3	2.4	Handheld/pocket database tools such as OREIS for hazmat lookup
1	2	2	3	5	3	2.6	Portable meter for predicting spill evaporation rates
1	2	2	4	4	3	2.6	Tailored surfaces in oleophilic skimmers
1	2	2	4	5	3	2.8	Oil transfer spill prevention using Radio Frequencey Identification tagged equipment
1	2	2	5	5	3	3.0	Devices to measure oil thickness
1	2	3	3	NR	3	2.3	Portable electronic tools to speed up information flow
1	2	3	3	5	3	2.8	Supplementary oil skimmer device for work boat
1	2	4	5	5	3	3.4	Temporary devices to protect sensitive areas
1	3	3	3	4	3	2.8	Wave Current Information System (WAVCIS) real-time wave, water level and velocity, and meteorological data system with online feed
1	3	4	5	NR	3	3.3	Oil spill identification system using microwave radiometer and radar unit
2	2	2	2	5	4	2.6	Nighttime oil tracking pads with reflective coating floats with oil, reflective or has small flashing light
2	2	2	5	NR	4	2.8	Integrating sensor data into response management & coordination tools
2	2	2	4	4	4	2.8	Use of existing security infrastructure (radars, cameras) for oil spill sensing and tracking
2	2	3	3	5	4	3.0	High Frequency radar systems for real-time current data
2	2	3	3	5	4	3.0	Aerial multispectral imaging to track spill thickness
2	2	3	5	5	4	3.4	Alert sensors integrated into booms or security systems
2	2	3	5	5	4	3.4	Underwater ultraviolet fluorescence spill detection (e.g., SSC-SD's system)
2	3	3	3	5	4	3.2	Portable ultra-violet lights for spill alerting and tracking
2	3	3	4	4	4	3.2	Central data repository for Area Contingency Plan and related information
2	3	3	4	5	4	3.4	Tools linking response efforts with harbor security monitoring
2	3	4	4	5	4	3.6	Airborne oil spill sensors such as LURSOT and SLEAF to detect thickness and oil along shorelines
2	3	4	5	5	4	3.8	Online Environmental Surveillance microwave network (OSIS) to track oil surface area and thicknesswith data fed to command center visualization.
2	4	4	4	5	4	3.8	Temporary devices to slow currents during refueling
3	4	4	4	5	4	4.0	Spill bioremediation

Color codes visually differentiate numeric scores into the four priority levels after rounding the scores to the nearest integer value.

RANKINGS EVALUATION

TOP-TIER TECHNOLOGY NEEDS

The results showed three tiers of rankings of the technology matrix. The top-tier rankings showed two technologies that are the most highly desired by the NOSCs: (1) improved predictive modeling and nowcasting of spills, and (2) "spill kits" that are composed of networked laptops containing software, electronic forms, and associated hardware (e.g., faxes, scanners) that would most likely be used within the ICS. Both of these top-ranked technologies should be considered for future investment by the PAA Program.

Trajectory Modeling

As mentioned previously, the ranking for the general need of better modeling tools was higher than rankings for specific models such as NOAA's GNOME and Transas Group's PISCES2 simulator, though those two ranked relatively high as well. Discussions with NOSCs suggest that available models have not accurately predicted trajectories in the past (CNRHI) and that the models cannot be run on NMCI machines (CNRHI, CNRSW, CNRMW). The predictive capability of the NOAA models may be lacking because of the non-specificity of the physical and hydrodynamic regime that the models are set up with, particularly for semi-enclosed bays, harbors, rivers, and estuaries. Validated hydrodynamic models do exist for several Navy harbors (e.g., San Diego Bay, CA; Sinclair Inlet, WA), but none of these have been adapted to include an oil spill trajectory component.

Improved models require investments into one or more of the following areas: (1) adding an oil-spill trajectory component to existing validated hydrodynamic models already developed for Navy harbors; (2) extending current validated models into the now larger Navy AORs; (3) improving, developing, and/or validating site-specific spill trajectory models in Navy AORs that do not already have validated models available; and (4) providing or developing access to models using Web-based tools that are machine (NMCI)-independent. Most, if not all of these efforts, should be run collaboratively with NOAA because of their overarching role in spill response and trajectory modeling in particular.

Efforts are already underway within the PAA Program to develop Web-based models (PAA Project ID 422). NOAA's Automated Data Inquiry for Oil Spills (ADIOS) chemical fate model is currently a part of this project and the Navy has already started discussions with NOAA to move GNOME to a Web-based model. The type of investment to be made for each regional AOR will require a review of which models are already available, their level of maturity (hydrodynamic model only, fate and transport, oil spill trajectory module, etc.), and level of accuracy (calibrated, validated).

Implementation would then take place region by region, using the best mix of available models with the incremental improvements suggested above. Because of the specific issues with chronic leakage and potential for a catastrophic release from *USS Arizona,* raised by CNRHI, investment in trajectory modeling should begin with Pearl Harbor.

The nowcasting portion of the technology need is a way to improve model predictions by running models using actual data collected during the spill as part of the input. This component of the need would require a tie-in to near real-time sensor data such as weather and oceanographic data, plume boundary position data, situational awareness data (e.g., presence of boom locations), and recovery data (locations and amounts of recovered oil). It would also require that the model accommodate these data inputs. Thus, many of the other sensing technologies that provide this type of data could play an important role in developing a nowcasting capability. An investment into nowcasting should

be implemented after standard trajectory modeling components are in place and the real-time sensor data become available.

On a final note, personnel at CNRSW drills identified a possible interest in having model trajectories pre-run for various spill scenarios (e.g., spill size, location, duration) at various time steps. This pre-run has been performed for parts of Puget Sound, Washington (Department of Ecology, 2003). These models could be added to the ACP and would serve as a starting point for the response effort in the absence of having a model run for the exact situation, which would take longer to obtain. However, this idea still requires that a validated spill trajectory model be available to run for the region of interest.

Spill Kits

The second technology in the top tier of rankings, spill kits, was identified as a method to provide NOSCs with an instantaneous computer networking capability, containing all pertinent documents, forms, software, and fax and scanning hardware. These kits would be used to improve situational awareness and flow of information within the ICS. What is envisioned for spill kits is a set of at least six laptops, a wireless phone modem, and a router that would interconnect each of the main units within the ICS command structure, including Unified Command, Planning, Situation, Operations, Logistics, and Finance.

This kind of capability can be brought in by outside contractors or other agencies, and has been used in some instances during drills (e.g., Precision Planning and Simulation, Inc.). The advantage of having pre-staged spill kits is that each region can have its AOR-specific documents, software, Web links, and forms (including their ACP, contact lists, ICS forms, financial system forms, or software, etc.), all pre-loaded. The kits could also be used to run other highly ranked software technologies (Tier 2 needs) such as the incident management software (e.g., AIMSonScene™), and support Internet-based monitoring and reporting (e.g., hosting Microsoft's SharePoint® Server, used during SONS 2007) and resource tracking (e.g., Genwest's E-Card system). A computer projector for situational awareness, also identified as a second-tier technology need, should be included in the spill kit package.

Part of the underlying need for spill kits is related to the frustration that NOSCs have with being unable to run non-NMCI-approved software and general access issues with NMCI machines. This issue was consistently identified as an impediment, particularly when working within the ICS (reflecting input from NOSCs and non-Department of Defense responders). The inability to use GNOME on a NMCI machine was cited as a particular problem by CNRSW. The situational status board and internal communications within the ICS were frequently cited as problem areas during drill debriefings in all the drills attended (CNRSW, SONS, CNRHI). The use of spill kits would therefore provide a huge benefit by allowing responders the ability to run any software in addition to providing computer infrastructure useful in running an efficient ICS.

Implementation of the spill kits would require a purchase of laptops, associated hardware (e.g., wireless routers, a projector, backup power units, phone cards, etc.), software, and other pertinent documents such as ICS forms and regional documents (e.g., ACP). Other items might include extra power cables, battery backups, and cabling to hardwire units. In some regions, the spill kits could be pre-staged where the ICS Command Center would form up in the event of a spill, or they could be kept stored together with a cart to easily move them to a command center at a moment's notice. Key factors for implementation are a requirement to have annual or semi-annual updates, maintenance of each spill kit, and the ability to reach the Internet through a high-speed service provider.

SECOND-TIER TECHNOLOGY NEEDS

The second-tier technology needs included the eight technologies that were ranked as very high priority (1) using the individual method and a high priority (2) using the numeric average method. Many of these second-tier technology needs were already mentioned within the context of implementing spill kits, such as a projector for providing situational awareness, PISCES2 trajectory modeling, incident management and resource tracking software, Internet-based monitoring and reporting, and digital and wireless ICS forms. The two technologies not mentioned above include an improved oil spill assessment capability to locate and track spill extent and thickness, especially in reduced visibility conditions, and better lighting systems (both were the highest ranked technology needs in the second-tier group). Better lighting systems should not require a specialized Navy research and development effort because a number of commercially available portable systems (both AC and DC units) exist that should fit this need. However, the PAA Program could consider funding a field testing program to ensure that the units meet the NOSCs' needs.

Locating and Tracking Spills

The need for improved capability to locate and track spills is a generalized version of several other lower ranked needs that identified a specific assessment method to fill this need (e.g., airborne sensor, drifters, radar-microwave systems). The heart of this need is that effective recovery of the spilled oil requires knowing where the oil is located at any given point in time and knowing its relative volume (thickness and area) so that it can be contained and recovered by booms and recovery vessels.

The current method for tracking a spill is to visually locate it by putting spotters into helicopters and planes, or spotting from shore or boats (many responders indicated that boat operators, particularly those doing recovery operations, have difficulty seeing where the oil is located). This method provides situational awareness information to the command center, typically as a verbal description of where the spill is located compared to geographic points of reference, but does not generally provide complete geolocation data.

While spill thickness can be partially ascertained by visual observation from the air, that information is typically at best qualitative (sheen vs. thin vs. thick). Additional quantitative information can be fed back to the ICS from recovery operations, but that information comes late in the process.

Tools to identify where the oil is located, its thickness, and where it is moving are really three separate tasks that may require three separate technologies. Locating the spill requires a sensor that can quickly identify presence or absence of oil, provide geolocation data, and be quickly scanned across the entire area of interest. This sensor must be an aerial sensor or a shore-mounted sensor that can look over a wide region (e.g., radar). Though a vessel-mounted sensor could also be used, its interaction with the spill itself would relegate its use to identifying the outer edges of the spill (though a subsurface vehicle could potentially be used).

A direct video transmission of the spill from an aerial asset along with along with Global Positioning System coordinates of its location could provide critically useful real-time situational awareness data that not only define spill location but also provide location information of response assets such as booms and boats. Addition of other optical wavelength channels (e.g., ultraviolet, infrared, microwave) might be used to enhance the ability to discern the interface between sheen and recoverable oil and provide significantly better information to the ICS. Multispectral sensors tested for this purpose (e.g., Svejkovsky and Muskat, 2006) have shown promise, though testing has usually been conducted only on crude oils, and sensors would need to be tested for use with the refined products commonly used by the Navy. A high-frequency microwave system such as the commercial OSIS system may also provide real-time spill location data out to 2 miles.

Tracking the movement of the spill over time can be done by repeated measurements with the sensors/methods described above. Additional tools for tracking include the use of low-frequency radar systems such as Coastal Ocean Dynamics Applications Radar (CODAR) and by using drifters. CODAR or similar systems measure ocean currents and thereby provide an indirect measure of where the spill is going. CODAR systems installed along the West Coast could potentially be accessed for the open ocean AORs.

Recent tests off San Diego by Payne, French-McCay, Terrill, and Nordhausen (2007) suggest that CODAR has some limited usefulness in tracking spills (e.g., thick layers of oil may be transported by sub-surface currents not detected by CODAR). In their work, drifter buoys were identified as a way to improve the CODAR trajectory predictions. Drifters are devices that get placed into the spill and can be tracked manually through visual sightings; They could also potentially be developed to provide a real-time data stream. NOAA and the Minerals Management Service in cooperation with other agencies such as California Fish and Game, have tested drifters for tracking spills.

Discussions with responders suggest that drifters tested to date did not tend to stay with the spilled oil very well or for very long. Many of these efforts were conducted in open ocean conditions (California State Lands Commission, 2006). Developing and testing drifters with real-time capability under a more specific set of conditions, such as shorter term deployments in semi-enclosed water bodies like Navy harbors, might be a more useful research investment to improve spill tracking capabilities.

A few types of spill thickness sensors have been tested, including the Laser Ultrasonic Remote Sensing of Oil Thickness (LURSOT) sensor and Scanning Laser Environmental Airborne Fluorosensor (SLEAF) sensor described by Brown et al. (2001), and an electrochemical method reported by Abdul-Wahab (2006). The optical methods are relatively large sensor systems designed to quantitate crude oil film thickness over large-scale spills from a DC-3 aircraft. All these methods appear to be in the research stage of development, a probable reason why the NOSCs ranked these methods as low priority. The OSIS commercial system also claims to measure oil thickness in addition to spatially locating the oil from a shore (platform) or ship-mounted system.

An alternative to these more advanced technologies used to measure spill thickness is a manual method developed by Svejkovsky and Muskat (2006). The method developed to validate a multi-spectral sensor places a pre-cleaned Plexiglas® plate vertically through the spill and analyzes the volume of oil collected on the plate. The technique appeared to be relatively quantitative. With some additional testing and method refinement, particularly with refined products, this technique could provide an easily implemented tool for quantitating spill thickness.

The highly ranked needs for better locating and tracking of spills and quantitating thickness should be considered for investment by the PAA Program. While the OSIS system may provide a solution to the need, it is likely a very expensive system to purchase, operate, and maintain, which is perhaps why the NOSCs rated it in the bottom tier of technology needs.

Development of an aerial real-time optical monitoring system should be considered for locating and track the spill. A real-time visual display from the air would be a huge advancement in situational awareness for the ICS. Cell-phone bandwidth is sufficient to send real-time photos and video directly to the command center and thereby provide a relatively low-cost solution. This tool could be deployed on current airborne assets or considered for use on unmanned aerial systems.

The PAA Program should also consider investing in the development of improvements in drifters for tracking spills, particularly at night or in poor visibility conditions. Improvements should include transmission of real-time drifter location data and an improved ability to stay with the spilled oil for short durations (1–2 days) in harbor-type settings. Finally, the PAA Program should consider

investing in testing and evaluating manual methods of quantitating spill thickness using an idea comparable to the sheet method employed by Svejkovsky and Muskat (2006).

The next five highest ranked technologies in the second-tier needs were previously discussed in the context of adding them to spill kits. In particular, the projector system should just be a part of the spill kits. Though use of PISCES2 trajectory modeling could easily be implemented on the spill kits, software cost would need to be considered rather than the cost of using the Navy contract with PCCI Inc. for drill training.

The use of the Incident Management System Software (AIMSonScene™) was not investigated further than reviewing the vendor website and going through the product demonstration. While potentially advantageous to the NOSCs within the ICS, the software is geared towards firefighting. The purchase and use of this software would likely be tied to available regional resources because of the significant training and adaptation component that would need to be addressed for implementation.

The Genwest E-Card resource tracking system was not investigated beyond visiting the vendor Website. CNRNW and SUPSALV are already using the Genwest E-Card resource tracking Website, but do not currently have access to E-Card full functionality (e.g., ICS forms, automatic filling out of fields on forms such as the 209, etc.). The only real technology issue seems to be the ability to gain access to the site and E-Card functionality, when needed (e.g., using the spill kits). It would seem quite reasonable for the other regions to implement use of the Website and gain access to the fully functional E-Card system.

The final two technologies identified in the second tier are an Internet-based monitoring and reporting system for situational awareness and electronic and wireless generation of ICS forms. As briefly mentioned before, Microsoft's SharePoint® Server system might be a very good off-the-shelf software tool that could be incorporated into the spill kits. This tool was employed at SONS 2007 (CNRMW) for sharing information and data (e.g., spill trajectories). It appears to be a tool that could be implemented fairly easily as part of a wireless spill kit used throughout the ICS. Electronic ICS forms could and should also be added to the spill kits. They are currently accessible on the Web in Mircrosoft® Word and Adobe® Portable Document Format, and therefore accessible on NMCI machines. Forms can be filled remotely and transferred to the ICS.

ExpeData, LLC demonstrated this technology at a local CNRSW exercise. Information written onto a digitized hardcopy form is transferred to the ICS directly over cell phones, Bluetooth® (currently not allowed at Naval Sea Systems Command facilities), and/or universal serial bus connections for immediate visualization and document storage. The technology could be implemented on the spill kits to make the forms available throughout the ICS. Additionally, the technology retains a hardcopy version of the reports for audit purposes or in the event of a power loss.

Third-Tier Technology Needs

Nearly all of the third-tier technology needs are embedded within the first- and second-tier needs, either as a subset of the need, or with an identified vendor-specific tool. These third-tier needs included electronically transmitted ICS forms, modeling tools, drifters for spill tracking, manned or unmanned aerial sensors for spill detection, and Web-accessible and wireless interconnections for sharing data and situational awareness. The remaining needs in the third tier include improved skimming technologies, spill containment tied to security booms, linking command centers for spill response, an improved absorbent pad, and real-time photo, audio, and video streaming to the command center.

Though video streaming was discussed previously in terms of top- and second-tier technology needs such as locating spills, streaming real-time video to the ICS via cell phones (e.g., Verizon® Treo® or Sprint® Pocket PCs®) can be used to show any aspect of the response. For example, streamed video could provide images of oiled birds to the shoreline assessment teams or show the progress of boom deployments and tanker trucks arriving on-site. The ability to easily implement this technology with the potential for dramatically improved situational awareness should warrant its consideration as a key investment area for the PAA Program.

The need for improved skimming techniques was identified early in the PAA "needs" process. Commercial entities are making considerable effort to develop and refine skimmer technologies. The same would be true for an improved absorbent pad. Though the PAA Program probably does not need to invest in the development of these technologies, it should consider test, evaluation, and demonstration of new technologies as they are brought online. The best approach would be to coordinate this process with SUPSALV. Adding spill containment to security booms does not appear to be a technology issue, but rather an implementation issue that needs resolution to ensure that the two types of needs (security and spill containment) can be met without degrading either capability.

Linking command centers for spill response is a need for two reasons. The first reason is that no full-time facilities are dedicated to spill response, and addressing spill response within the Regional Operation Centers (ROCs) being built for each Navy Region may be beneficial. The other reason is that information available to the ROCs or other similar command centers may be useful to the responsers (e.g., facility cameras, vessel security).

Forming up the ICS within a ROC could provide space, communications, computers, and other assets to the responsers. However, this option is probably not feasible because of physical size, data classification, and security access issues. Data available to the ROC could potentially be shared with the command center stood up for the ICS. Though there would still be classification issues with some data (e.g., vessel tracking), an attempt should be made to coordinate the available information. This recommendation is probably outside the scope of the PAA Program, but should be investigated by CNIC within the process-driven Lean Six Sigma initiatives.

An additional comment regards forming up the ICS. While no full-time Navy facilities are dedicated for this purpose (hence, the need for spill kits), the Hawaii Oil Spill Response Center, which is run by the Clean Islands Council, provides many of the technologies and resources needed by the NOSC (e.g., networked computers, electronic forms, communications, etc.). This resource could be made available to CNRHI on a cost-effective basis if the region was allowed to enter into a contract. This recommendation is again outside the purview of the PAA Program, but should be considered under the Lean Six Sigma initiatives.

PRIORITIZED RECOMMENDATIONS

The goal of this IDR is to provide the PAA Program with a roadmap for making future technology investments that will provide the Navy spill response community with tools or techniques that enhance their capability to mitigate environmental damage and costs. The following list of prioritized recommendations is based on NOSC input, their needs rankings, and an initial assessment of feasibility and implementation.

IMPROVED OIL SPILL TRAJECTORY MODELING

This need was one of the two top technology needs identified by the NOSCs. The PAA Program should consider investing into this arena to develop more accurate spill trajectory predictions specific to Navy AORs. The Navy's Uniform National Discharge Standards, PAA Program, and other Navy environmental programs have already invested in validated hydrodynamic and fate and transport models in some Navy harbors. These models have been used to evaluate the fate and transport of contaminants derived from ship discharges, dry docks, other Navy facilities and watersheds to meet compliance and cleanup program requirements (e.g., Total Maximum Daily Loads). Additionally, the PAA Program is funding the development of a Web-based model server that will support Web access to several models, including NOAA's ADIOS oil spill weathering model. This collaboration with NOAA should be promoted to improve the access and accuracy of models (e.g., NOAA's GNOME) available in the Navy AORs.

Development of trajectory models should be conducted incrementally, first by identifying the current status of model types and maturity of models available in Navy AORs, and second, by defining the specific incremental improvements that are required to ensure a validated trajectory model, and third, by executing on model development, given a prioritized list of Navy AORs. The specific need identified for a better Pearl Harbor model, particularly as it pertains to *USS Arizona*, should be considered a very high priority. The slicks routinely generated by *USS Arizona* pose a ready-made validation data set.

Deliverables from an Improved Oil Spill Modeling Capability Project should consider (1) providing key spill scenarios that can be pre-loaded into each region's ACP, (2) extending models to the full AOR, (3) the potential to take input from sensor data to improve real-time predictions (nowcasting), and (4) providing a Web-based tool and training to allow the model to run from any machine in each region.

SPILL KITS IMPLEMENTED

The spill kit was the other top-ranked technology need identified by the NOSCs. Implementation of these kits requires investment by both the PAA Program and CNIC. The PAA Program should consider funding development of a prototype system that would be tested and demonstrated during spill drills in each of the Navy regions. Testing would have to consider potential region-specific needs, including differences in where systems would be stored and used, variations in software used by NOSCs and other regional responders, communications packages, region-specific forms, the ACP, and databases. Spill kit development should consider including other high-priority needs identified, such as a digital forms transfer capability (e.g., ExpeData™), data sharing software (e.g., SharePoint® Server), and real-time video streaming capability using cellular phone technology (e.g., Verizon™ Treo® or Sprint® Pocket PCs®). Management software such as AIMSonScene™ and Genwest's E-Card could be implemented as well, but might be region-specific. Once a system was fully demonstrated, CNIC would need to implement its use through purchase, maintenance, and training for each region.

IMPROVED LOCATING AND TRACKING OF SPILLS

The next priority need identified by the NOSCs was better methods of locating (areal extent and thickness) and tracking spills. Defining area coverage is best done by aerial surveillance. Improvements to how this work is currently performed would include real-time video streaming to the ICS to provide direct situational awareness. It could also include another optical method/channel to enhance the demarcation between oiled and non-oiled water. The PAA Program should consider investing in the development and testing of systems that provide these types of data, as well as adapt them for use in aerial assets (e.g., helicopters, fixed-wing aircraft) available for use in each region. Consideration should be given on how data are transmitted throughout the extended AORs.

Tracking the spill could include the repeated measures described in locating the spill in the first place. However, nighttime tracking is a requirement in the CNRNW AOR, and could potentially be required elsewhere. The PAA Program should therefore consider investing in improvements to drifter buoys that can be placed directly into the spilled oil. The investment should include testing physical modifications and/or better implementation techniques of commercially available drifters that improve their ability to track with the oil. The investment should also include adding a capability for real-time location data transmission to provide direct feedback to the command center for situational awareness, as well as provide the means for locating and retrieving the drifters. The ability to use drifters in open ocean areas of the AOR should also be considered.

Though automated systems to measure spill thickness are potentially available, these systems are in the early research stages, have only been tested on crude oils, and may be better suited to a 24-hour surveillance system (OSIS) than as a responder tool. However, the PAA Program should consider investing in testing and evaluating manual techniques that could be effectively used by on-the-water responders. The manual sheet technique developed by Svejkovsky and Muskat (2006) appears to be a simple approach to measuring thickness that could be implemented readily. The investment should focus on quantitating thickness with a variety of refined fuel types.

VIDEO AND DATA STREAMING

Though it was suggested that current technologies that can provide video and data streaming directly to a command center be included as a part of the spill kits and for location or tracking spills on the water, their inherent usefulness as a situational awareness tool merits an independent consideration for PAA Program investment. This off-the shelf technology (e.g., Verizon Treo® or Sprint® Pocket PCs®) is being tested and implemented around the country (e.g., USCG, San Diego Police Department). The ability to send back live video and other data such as text and ICS forms from the field offers a potentially large jump in situation information that is not otherwise available.

SUPPORT

As previously mentioned, two NOSC needs were identified during and after the ranking process that were not prioritized. The first included additional training, modeling, or sensors that could be used in the NOSCs' recently expanded AORs. The PAA Program should ensure that projects that go forward should at least consider where the tools or techniques can be used, within bays and harbors versus open ocean conditions. The second need was to develop a model to determine exposures and associated health risks of Navy spills to responders, which would identify when personal protection equipment would be required. The PAA Program, in direct consultation with the NOSCs, should consider this model as another possible investment area.

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APPENDIX A:

Formal Navy Needs
For Oil Spill Prevention & Response

FORMAL NAVY NEEDS
FOR OIL SPILL PREVENTION & RESPONSE
from Pollution Abatement Ashore (PAA) Program

2007 NEEDS

N-0449-07: Spill, Prevention, Response and Contingency Program Supervisor

Need ID:
N-0449-07

Title:
Spill Pevention, Response and Contingency Program Supvervisor

Rank:
HIGH-Being Addressed By Existing Efforts

Rank Comments:

Similar Needs:
N-040-06 Portable Sensor/Detector System for Surface Water Fuel/Oil Spill

Date Submitted:
1/26/2007 5:04:05 PM

Command-Activity That Submitted The Need:
NAVSEA-Puget Sound Naval Shipyard & Intermediate Maintenance Facility

Submitter:
Jim McDonald

Submitters Address:
1400 Farragut Avenue
B427-2
Bremerton, WA 98314-5001

Submitters Phone, Fax, and Email:
360-476-9678
360-176-8550 (Fax)
james.a.mcdonald@navy.mil

Environmental Enabling Capability (EEC):
4-Shore Readiness

Pillar:
Clean Up

Description:
As long as fuel/oil spills cannot be completely eliminated, Naval facilities need improved equipment for detecting and mapping the spread of such spills. The ability to quickly detect and identify the type of oil on water around ships in day and night operations and in different sea states should facilitate the identification of the spill source and the subsequent response effort.

Currently, spill detection is mostly limited by sighting sheen on the water surface. This is at best limited to day time operation only, and such sighting does not provide any information as to the type of fuel/oil present. Some recent attempts in deploying partially submerged chemical sensors in a harbor also turned out to be unsatisfactory. Experience has shown that these sensors usually required land based power, could not reliably distinguish harmless cooking oils and creosote (from timber and pilings) from fuel or petroleum products. As a result, the false alarm rate and maintenance cost are too high for the system to be practical. In addition, such systems are not portable in that they cannot be moved from one pier to another once they are deployed. The need is for portable equipment to allow personnel on a small boat to quickly map out the extent of the spill, identify the chemical nature of the spill, and estimate the approximate thickness of the oil film. Environmental damage and clean up costs increase rapidly if a harmful spill is not reliably detected and the spill source secured in all weather operations.

Ramifications:

Because there is no reliable means to detect fuel/oil on water at night, some damaging spills have occurred in the past resulting in poor publicity for the Navy and high cost for the subsequent response efforts. A lack of the type of portable equipment suitable for all weather operation prevents the efficient deployment of resources to deal with a spill. Unacceptably high frequency of false alarms in existing systems also proves to be problematic. This impacts adversely the readiness of the Fleet and shore facilities.

Key Policy or Regulatory Drivers:

The Oil Pollution Act of 1990 (OPA90) requires the Navy to maintain readiness responding to worst case discharges of fuel/oil. Navy spill reports (available in www.noscnet.org) have high visibility in CNO and in other Federal agencies such as EPA.

Sugested Solutions:

The chemical and physical principles for the detection, identification, and quantification of fuel/oil products appear to be well understood, as evidenced by the availability of laboratory equipment in the market place for such applications. Table-top equipment based on optical technologies (in visible, infrared, and ultraviolet spectral regimes),chromatography, and mass spectrometry are available. Recently developed chemical sensing technology for homeland security are also finding applications in environmental condition monitoring. It should be clear that the requirement stated here cannot be met by pursuing additional scientific research in these principles but rather by integrating the technologies already exit commercially and to adapt them in a cost effective manner in easy-to-use portable equipment based on these well-known principles. Useful attributes for the proposed solution include ruggedness, remote sensing capability, and provision for marking the geographic locations where fuel/oil is detected and quantified. The system should be operational insensitivity to daylight, darkness, fluctuations in temperature, sea state, and wind conditions. The weight, cost, the complexity for equipment maintenance, and the immunity to false alarms are also important considerations. The capability for enabling personnel to quickly assess the seriousness of a spill via information on the thickness of the oil/fuel on water and the extent of the spread of the contaminated region will also be important. It is envisioned that the integration and clustering of a number of commercially available technologies could result in a solution for these needs.

N-0488-07: Shore and Ship-to-Shore Oil Transfer Spill Prevention

Need ID:
N-0488-07

Title:
Shore and Ship-to-Shore Oil Transfer Spill Prevention

Rank:
MEDIUM-Request PAA Pre-Proposal

Rank Comments:
Incorporate more information about the various causes of the Navy's spill events. Pre-proposal needs to reflect interfaces with Wayne Blodgett (CNIC) and others in the Navy's spill prevention program.

Similar Needs:

Date Submitted:
2/1/2007 4:05:03 PM

Command-Activity That Submitted The Need:
NAVSEA-NSWCCD

Submitter:
TRACY J HARASTI

Submitters Address:
NSWCCD
CODE 6340

Submitters Phone, Fax, and Email:
301-227-4022
301-227-5959 (Fax)
TRACY.J.HARASTI@NAVY.MIL

Environmental Enabling Capability (EEC):
4-Shore Readiness

Pillar:
Pollution Prevention

Description:
Prevention of ship to shore and shore based oil spills is an environmental concern for the Navy. The problem is more significant when considering that one (1) quart of oil has the potential to pollute ~ 14,500 gallons of water. Shore base activities reported nearly 1,283 spills totaling more than 444,700 gallons between FY00 and FY06 (data from the U.S. Navy's NOSCNet website). In the past, fuel/oil spills from US Navy ships have received high level attention from US Congress and states, such as, California, Texas and Washington. In addition to potentially tarnishing the Navy's reputation as a good corporate citizen, the estimated cost to the Navy for shore and ship to shore oil spill clean-up is approximately $8.5 million annually. For Fiscal Year 2006 the majority of spills were attributed to personnel error (1,983 gallons), piping/hose/tubing failures (1,260 gallons), overfilling tanks (785 gallons), electro-mechanical equipment failures (213 gallons), and seal/gasket/o-ring failures (203 gallons). Currently, standard training classes, paper procedures, and intensive/costly containment technologies are deployed to areas were spills or accidents may occur. The training is OJT (On-The-Job) and conducted no more than annually. The training provides no real accountability or interlock to a safe oil/fuel transfer. The use of containment, to control spills and mitigate potential environmental impact, is a legitimate, but reactive approach that addresses the symptom, and not the root cause of oil spills. Alternate solutions, that provide continuous training and increase accountability, and employing technologies that can enable a seamless interlock to the oil/fuel transfer process are available and may be integrated into fleet operations. This approach, coupled with the use of technologies with improved mechanical characteristics and performance, might also be incorporated directly into the actual process to prevent specific spills and significantly reduce accidental spills.

Ramifications:
The Navy will continue to have oils spills associated with personnel error, transfer system valve misalignment, and equipment failure issues. The environmental sensitivities, ramifications and costs associated with clean-up and lost fuel will continue to occur.

Key Policy or Regulatory Drivers:
Clean Water Act
Oil Pollution Abatement Act of 1990

Sugested Solutions:
Use Radio Frequency Identification (RFID) in conjunction with handheld data collectors as a training aid with an electronic check-off for achieving proper system alignment. This technology coupled with the use of smart hose technology and valves can reduce the oils spills caused by human error and hardware failure which cover the majority of the spill causes. RFID technology will be coupled with hand-held portable data devices that incorporate the fuel transfer procedures and alignments, act as maps or a guidance system for the fuel handler to find and locate specific hardware and acts as a check-off sheet, logging the actual positioning or alignment of valve critical for a safe fuel transfer. The aide would be configured for training purposes or could be used as validation of the alignment prior to transfer while logging times and milestones in the process. In the manual fuel transfer mode, the device will be use to determine whether proper alignment was completed. If the device carries the correct sequence, the fuel boss will allow the transfer to begin and, in automatic fuel transfer systems, the device will be the last interlock before the transfer function begins. The device puts much more individual accountability into the fuel transfer process as well. Utilizing smart hose and additional sensor technologies reduces the risk associated with hose failure, accidental/early disconnects, improper blow-downs, over pressuring, and misaligned connections between sources.

PRE-2007 NEEDS

N-0404-06: Sensors/Detection for Surface Water Oil Spills

Need ID:
N-0404-06

Date Submitted:
3/27/2006 12:00:00 AM

Command-Activity That Submitted The Need:
CNO-Commander, Navy Installations Command

Title:
Sensors/Detection for Surface Water Oil Spills

Environmental Enabling Capability (EEC):
4-Shore Readiness

Pillar:
Pollution Prevention

Description:
Fast detection and response is a key component of managing oil spills. Spills on water spread very quickly, a problem that is compounded if the spill source is not identified and secured. Spreading oil can impact natural resources, exponentially increasing response costs and environmental damage. Oil spills need to be identified and dealt with before they spread.

Ramifications:
Undetected and uncontrolled oil spills can result in major environmental impacts and poor public image. This can include extremely high response costs.

Key Policy or Regulatory Drivers:
The Oil Pollution Act of 1990 (OPA90) requires the Navy to maintain readiness to respond to worst case discharges of petroleum.

Sugested Solutions:
Solutions could include automated and/or hand held sensors that could be used by personnel within oil booms during night time operations to identify when a sheen develops and alert the fueling crew to stop. This could also include a ruggedized sensor that could be easily deployed on small recovery vessels that would be used to measure and map out where and what type the oil is and provide better information to the spill team on where to set up recovery equipment.

The solution could include hand held UV lights for identifying sheens, calibrated fluorometers deployed on boats that can measure and map oil concentrations, sensors integrated into security and/or oil boom systems, or sensors

deployed on free-floating drifters that float along with the oil that provide information on where the oil is moving. Another option would be to have some sort of aircraft mounted sensor that could quickly map the spill from the air.

N-0138-02: Harbor Oil Spill Response Needs

Need ID:
N-0138-02

Date Submitted:
12/1/2002 12:00:00 AM

Command-Activity That Submitted The Need:
NAVFAC-NFESC

Title:
Harbor Oil Spill Response Needs

Environmental Enabling Capability (EEC):
4-Shore Readiness

Pillar:
Compliance

Description:
Note: This item is submitted as an expansion of project N-0110-02 (Lack of Boom Materials).

Forty (40) to 60% of NAVFAC Oil Spill Response Program equipment funds ($2-4Mil) are expended annually on oil containment boom procurement. Servicelife extension through: product improvement; and better or reduced cleaning, maintenance and repair need are issues that have significant potential for reducing yearly equipment replacement costs. Tests are currently being conducted at CBC Port Hueneme and NAVSTA Pearl Harbor locations to determine marine growth rates in "cold" and "warm" water environments. Current analysis of test data is providing direction for new ideas, futher study and field evaluation. Program servicelife extension of even 1 to 3 years for boom has the potential to reduce boom replacement cost by $500K-$1.5Mil+ annually. Expectations are that activity maintenance and labor requirement will also be greatly reduced.

Ramifications:
Reduced equipment procurement budgets limit support for Navy harbor oil spill response needs reducing oil spill response readiness. Activity budgetary and personnel reductions impact an activity's ability to provide labor intensive maintenance and cleaning necessary to extend servicelife of boom. Poorly maintained boom does not provide necessary containment in the event of a spill and requires earlier replacement. The Navy transfers large volumes of DFM and JP fuels at many shore locations having sensitive natural and cultural resources that could be negatively impacted.

Key Policy or Regulatory Drivers:
The Clean Water Act and the National Contingency Plan require that the Navy maintain a capability to respond to and clean up oil spills. Containment boom is a critical component of an effective reponse posture.

Sugested Solutions:
Potential solutions include improved boom design to reduce cleaning, maintenance, and repair effort and also to provide easier boom handling. Improved boom design that requires less cleaning and maintenance, is easier to clean and repair when needed, hardware (cables, connectors, chains, etc.) that lessen biofouling, saltwater corrosion, and fabrics that are less prone to abrasion during handling can be tested and analyzed. Another solution could be improved boom cleaning equipment such as a barge or platform mounted system that could clean boom in-place.

APPENDIX B:

Compilation of Navy User Email Communications on Oil Spill Technology Needs Assessment

Compilation of Navy User Email Communications on Oil Spill Technology Needs Assessment

Purpose: The purpose of this document is to capture pertinent email comms with NOSC end users about their potential needs for oil spill prevention, assessment and response technologies.

- this document provides the original comms and context representing the initial NOSC input (edited only to correct spelling/grammar and exclude unused portions and email strings)
- Highlights indicate what was brought into the tech matrix (Appendix G), except if comment with highlight proposes it for inclusion. App G evolved into the survey form sent out to NOSCs for their ranking (Appendix H).

From: Davenport, Mike CIV CMDR Navy Region SE
Sent: Tuesday, July 17, 2007 12:32 PM
To: Katz, Chuck SPAWAR
Subject: CNRSE INPUT FOR THE OIL SPILL RESEARCH WORK EFFORT.

Here is my input to the matrix. I have added some other items at the bottom. I have grouped my ranking in any category since I do not feel I have the technological knowledge to recommend a specific technology solution. My ranks are based on the spill response need requirement and which technology to help solve that is up to others to do.

Michael Davenport
Environmental Compliance Branch Head
COMNAVREG Southeast Code N451
P.O. Box 102
Jacksonville, FL 32212-0102
Phone: 904-542-8044

[following pasted in from additional inputs on spreadsheet…]

Under recovery the bioremediation idea I would recommend discussions with US Coast Guard about using bioremediation in waters of the US.

Training of personnel: can make it web based training of ICS 100,200, 300, 400 etc be available. US Coast Guard may already have.

Have all the Navy major ports like Mayport, Kings Bay, Corpus Christi, Charleston being modeled? It would be good if all Navy ports have a computer model to assist with spill movement and migration and protections of wetlands and shorelines.

Since Regions will probably take on larger AOR and sections of ocean We need some training and helpful aids in dealing with open ocean spills and tactics and strategy.

Are there Navy ship radio buoy markers and weather devices available to deploy by ship to assist in open ocean assessment of a Navy spill to help determine direction, evaporation rate, speed, etc.

Have all the Navy ports of call being modeled? Navy ships go to Naples, Bahrain, San Juan, Freeport, South America, etc. Since Region probably will have greater AOR with foreign ports the NOSC will need tools to help support spills in foreign ports. It would be good if all Navy ports have a computer model to assist with spill movement and migration and protections of wetlands and shorelines.

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-----Original Message-----
From: Pang, Cynthia Y CIV NAVREGHAWAII, N45
Sent: Thursday, July 05, 2007 12:42 PM
To: Katz, Chuck SPAWAR
Subject: RE:

Hi Chuck,

Sorry but I was only able to do a quick review of the matrix. Many seemed to be similar to one another. The focus on the matrix seems to be oil and water. What about oil on land or HS releases on land/water?

Some of the items were difficult to rank unless I saw it in action.

Others may not work in Pearl but I ranked it anyway on how important it would be to spill response.

The sensors for oil spill would be great but it would depend on the sensitivity. It could go off quite often here in Pearl Harbor due to the USS Arizona.

Also, we don't normally do night time ops. It's too dangerous for the responders but should a really large spill occur, I'm sure we would.

Anti-fouling booms would be great. Hawaii would be an excellent location for a test case due to our high growth rate. Although I do recall SPAWARS trying something out years ago in Pearl Harbor.

Use of security cameras currently is not effective. The ones we have installed are at bad angles and depending on the location of the sun, it's hard to see the oil.

Having the ability to write up reports and ICS forms in the field is a great idea. Unfortunately, it might be just me but, during the recent spill I didn't have the time. During the initial bunch of days I was so focused on the response that I kept forgetting to write things down. You mentioned Blackberry to me but that's just another leash. You receive emails and phone calls from all over that it makes your head spin. It was really great when I couldn't get access to emails. I could concentrate on the response. It could have been due to the lack of TRAINED personnel.

Having wireless broadband cellular capability is a HUGE plus. We should also be able to insert it into any computer and not just a Navy/NMCI one.

Having only TRAINED personnel involved in the response it really needed. Personnel assisting/leading without extensive response and/or ICS training makes our job harder. Too many untrained hands in the pot. This also includes contractors.

Absorbents with the ability to pick up sheens would be a plus.

Is the ability to determine the thickness to be used to help us determine an approximate quantity released?

Other things to consider is training to respond in the open ocean. With our AOR extending to 12 nm, the response is way different from within the Pearl Harbor basin.

MAJOR item that I would like to see resolved is the ability to join a COOP. They have all the assets we would need and more. For the Navy to build up this the level of the coop's capability and to maintain would be a tremendous burden on our funds. The major hurdle for us is having the contracting officer place all sorts of contracting lingo on the service member agreement. Can't the Admiral within his authority as the NOSC sign a service member agreement without having to go through contracts? If our recent incident hit the water, it would have been a major nightmare for the Navy. To get a non-service member agreement signed would take days. Yes, we are fortunate to have SUPSALV but we would have needed other resources that SUPSALV doesn't have.

Gotta run.....I'm sooooo behind on everything.

VR,
Cynthia
==========
From: Costello, Martin CIV CNRMA Env [martin.costello@navy.mil]
Sent: Monday, June 25, 2007 5:47 AM
To: Katz, Chuck SPAWAR; Davenport, Mike CIV CMDR Navy Region SE; Montoro, Don N CIV; Cruz, Tito F CIV NAVSTA San Diego; Brown, Tammy CIV PSNS, N45RO2; Hayes, Dan CIV COMNAVREGNW Environmental N45; Pang, Cynthia Y CIV NAVREGHAWAII, N45; hoovera@guam.navy.mil; courtneyt@cfac.cnfk.navy.mil; n44E@cnfk.navy.mil; dominic.broadus@cnre.navy.mil; mark.schultze@navy.mil; lonnie.ross@fe.navy.mil; jeffrey.laitila@fe.navy.mil; kelly.deveraux@navy.mil
Cc: Gauthier, Ron SPAWAR; Blodgett, Wayne CIV CNIC HQ, N45; scott.trembly@navy.mil; Curtis, Stacey SPAWAR; Mauro, Scott CIV (NAVFACHQ); Porter, Christine H CIV CNRMA, N45
Subject: RE:

Follow Up Flag: Follow up
Flag Status: Blue

Attachments: OilSpillMatrixNOSCinput.xls

Chuck,

I ranked the technology proposals attached. My biggest priority or concern relates to communications during a worse case spill. In looking at some of the Post Katrina after action reports, seems that the first thing to go down is comms. I saw one item with a satellite communication capability that could be helpful. One of the lessons learned from Katrina noted that we need off the shelf laptops with a satellite card capability to communicate with the outside world to report on spill impacts be it a natural, or man-made disaster.

I believe that we also need hand-held radios with GPS and some mapping functions to communicate and document spill impact and clean-up areas.
This data could readily be uploaded to a corporate website for real time situational awareness to headquarters or other trustees.

To support or augment ICS and spill response training, I can't say enough about having a spill modeling capability. Having a Navy-Corporate spill modeling and predicting trajectory would greatly improve our program. Again, this was the intent of PISCES but it can only be obtained by purchasing a licensed copy at about $25K.

Regarding installed spill monitoring / sensors, etc., these sound like interesting products, but I'm concerned about the value added since these systems will require a significant cost to maintain and our policy at midlant is to not conduct fueling, or fuel transfers at night. I believe that if we tighten up the fueling, de-fueling, internal transfer processes, and perhaps incorporate technology devices in these processes, we may not have to be concerned about sensing a release if we can prevent one via. technology in the first place.

R/Marty Costello, CNRMA NOSC Representative

From: Montoro, Don N CIV
Sent: Thursday, June 21, 2007 1:32 PM
To: Katz, Chuck SPAWAR; Costello, Martin CIV CNRMA Env; Davenport, Mike CIV CMDR Navy Region SE; Cruz, Tito F CIV NAVSTA San Diego; Brown, Tammy CIV PSNS, N45RO2; Hayes, Dan CIV COMNAVREGNW Environmental N45; Pang, Cynthia Y CIV NAVREGHAWAII, N45; 'hoovera@guam.navy.mil';

'courtneyt@cfac.cnfk.navy.mil'; 'n44E@cnfk.navy.mil'; 'dominic.broadus@cnre.navy.mil'; mark.schultze@navy.mil; lonnie.ross@fe.navy.mil; jeffrey.laitila@fe.navy.mil; kelly.deveraux@navy.mil
Cc: Gauthier, Ron SPAWAR; Blodgett, Wayne CIV CNIC HQ, N45; scott.trembly@navy.mil; Curtis, Stacey SPAWAR; Mauro, Scott CIV (NAVFACHQ)
Subject: RE:

Chuck: I looked over the matrix and chose not to participate as I feel that any one or two of these would not likely result in any significant improvement. I don't know the proposed budget but, considering the infrequency of significant spills, I would recommend a cost benefit analysis for any candidates. I feel the Navy would be better off by participating in local, regional or national co-ops and having access to the latest in technology that would be used by industry and the response community in their AOR. Best regards, Don

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From: Katz, Chuck SPAWAR
Sent: Thursday, June 21, 2007 11:02
To: Costello, Martin CIV CNRMA Env; Davenport, Mike CIV CMDR Navy Region SE; Montoro, Don N CIV; Cruz, Tito F CIV NAVSTA San Diego; Brown, Tammy CIV PSNS, N45RO2; Hayes, Dan CIV COMNAVREGNW Environmental N45; Pang, Cynthia Y CIV NAVREGHAWAII, N45; 'hoovera@guam.navy.mil'; 'courtneyt@cfac.cnfk.navy.mil'; 'n44E@cnfk.navy.mil'; 'dominic.broadus@cnre.navy.mil'; mark.schultze@navy.mil; lonnie.ross@fe.navy.mil; jeffrey.laitila@fe.navy.mil; kelly.deveraux@navy.mil
Cc: Gauthier, Ron SPAWAR; Blodgett, Wayne CIV CNIC HQ, N45; scott.trembly@navy.mil; Curtis, Stacey SPAWAR; Mauro, Scott CIV (NAVFACHQ)
Subject:

Dear NOSC -

We have contacted you previously regarding our Pollution Abatement Ashore (PAA) Program project to identify and prioritize where innovative and cost-effective technologies can be brought to bear on oil spill prevention, detection, and response. The goal of this effort will be to develop a technical basis for developing an oil spill response investment strategy for the Navy. However, any future investment in new oil spill response technology must first be responsive to your needs.

Some of you have already provided ideas to us in emails, phone calls, drills, and meetings. We have tried to capture these ideas on the attached technology matrix spreadsheet. We would greatly appreciate it if you could take a few moments to review this list and provide us with feedback on the technology ideas already identified by numerically ranking them within each of their groupings (e.g. Prevent, Sense, Assess, etc.) directly on the spreadsheet. We also want to capture any other ideas you may have that are not covered in the matrix, so please add these to the spreadsheet with your ranking.

Please return the spreadsheet by email by 13 July 2007 so that we may begin the final compilation and rankings that will go into our Initial Decision Report to the PAA program. We will provide you an additional opportunity to give comments on the draft report sometime in August.

Feel free to contact us with any questions or comments you may have. Thank you in advance for your consideration.

v/r Chuck Katz

-----Original Message-----
From: Pang, Cynthia Y CIV NAVREGHAWAII, N45
Sent: Friday, May 11, 2007 8:58 PM
To: Katz, Chuck SPAWAR
Cc: Gauthier, Ron SPAWAR
Subject: RE: TechBoard Poster Follow-up

Hi Chuck,

Sometimes it's a good thing not to have a blackberry.....

It's been really hectic the last couple of weeks. Remember ICS?? Well, many involved didn't go through the classes and it made it a little difficult at first. Some that did go through the class forgot what was taught. Sad to say, even me. When you're really tired, ICS doesn't enter your mind. The more practice we receive the better we should be. One thought is to require contractors to go through ICS if they are to be involved in a response. We had remediation contractors working the incident and it didn't seem they understood the process.

The NOSC was Admiral Alexander during this incident and his Deputy was CAPT Skardon. Having the WCD exercise just over a month ago really helped. CAPT was familiar with the other members of the Unified Command. It made it easier for discussion/decisions.

Blackberry, hmmm....Probably a good idea. There are pros and cons to having it.

I've requested a wireless high speed broadband modem for the laptop. Having internet capability in the field is a definite plus. Many times I had to come back to the office to do research. It would have made it much easier to do it in the field. Although the distance from the site to the command center isn't far, finding parking, walking to the command center, etc. took time. Would this be something you can provide or help obtain?

The OSC definitely needs his/her own vehicle. This way I can store equipment in the vehicle and leave it there. Many times, I'm going back and forth because I forgot a piece of equipment. If I can leave my equipment in the car, it would be fantastic. Since I'm sharing the vehicle with others in the office, the inspections stop because I'm utilizing it for long periods of time. Also, a government vehicle is needed to drive onto the pier areas. During this tank 48 incident, there was a 75 gal diesel spill in the water. I had to drive back and forth between the two sites.

Mobile fingerprinting capability would be great. I procured the Ahura but it still doesn't have the accurate fingerprinting capability right now that I need.

There were many lessons learned that I'll share with you later. Just remind me if I forget. Once plus on this incident is the oil was underground and not in the water. Things weren't as hectic as it might have been if the fuel had gone into the harbor.

Sorry if this email is choppy. I'm still recovering from lack of sleep.

Take Care.

VR,
Cynthia

-----Original Message-----
From: Katz, Chuck SPAWAR
Sent: Thursday, May 10, 2007 5:55
To: Pang, Cynthia Y CIV NAVREGHAWAII, N45
Cc: Gauthier, Ron SPAWAR
Subject: RE: TechBoard Poster Follow-up

Cynthia-

I understand you're pretty busy these days! If you don't mind my intrusion, your lack of email access needs to be rectified (though not because of my email)!! Even NMCI provides blackberry service that would give you direct email in the field. Maybe this big response effort highlights that need. No need to reply soon on this but when you get a chance, let me know your thoughts on this-and maybe any other lessons

being learned on this bigger, longer-term response effort.

Take care, and be sure to get your rest!!

Chuck

-----Original Message-----
From: Pang, Cynthia Y CIV NAVREGHAWAII, N45
Sent: Thursday, May 10, 2007 8:49 AM
To: Katz, Chuck SPAWAR
Subject: Out of Office AutoReply: TechBoard Poster Follow-up

Hi,

I'm currently out of the office working on an incident. Will not have continual access to emails. If you need immediate assistance, please call my cell phone at 864-2463.

RE: Oil Spill Response Technology Assessment
From: Brown, Tammy CIV PSNS, N45RO2 [tammy.brown@navy.mil]
Sent: Friday, April 27, 2007 8:37 AM
To: Katz, Chuck SPAWAR
Subject: RE: Oil Spill Response Technology Assessment

Do you want us to send you dates of equipment deployment exercises, or just tabletop/command post exercises?
==========

RE: Contact Info
From: Blodgett, Wayne CIV CNIC HQ, N45 [wayne.blodgett@navy.mil]
Sent: Tuesday, April 24, 2007 11:43 AM
To: Katz, Chuck SPAWAR
Subject: RE: Contact Info

Chuck, The email addresses in Japan have changed. Here is Jeff Laitila's current address:

jeffrey.laitila@fe.navy.mil

Jeff is currently the Environmental Program Director for the Japan region. The NOSC program is currently being run by Lonnie Ross. I believe his address is:

lonnie.ross@fe.navy.mil

If Lonnie's email doesn't work, try Jeff, or better yet try sending to both.

We have talked about an annual conference for the NOSCs but lack of travel funds has prevented it. I agree that it would be a good way to exchange ideas.

Wayne

-----Original Message-----
From: Katz, Chuck SPAWAR
Sent: Tuesday, April 24, 2007 14:26

To: Blodgett, Wayne CIV CNIC HQ, N45
Subject: Contact Info

Wayne-

The email contact info you had for Jeff Latila from Yokosuka Naval Base in your POC sheet did not work. I tried some variations on it but to no avail. Any ideas?

By the way, the email I sent earlier today has already proved quite useful as I've now been contacted by Kelly Devereaux (SONS exercise) and Marty Costello. Many thanks for the POC info.

Also-is there a yearly meeting where all the NOSCs get together to exchange notes? A venue like that could really foment some exchange of ideas. An alternative might be a tele- or video-conference. Let me know if anything like that is planned.

Thanks,

Chuck
==========
FW: Technology workshop
From: Montoro, Don N CIV [don.montoro@navy.mil]
Sent: Tuesday, April 24, 2007 9:16 AM
To: Katz, Chuck SPAWAR
Cc: Blodgett, Wayne CIV CNIC HQ, N45
Subject: FW: Technology workshop

Attachments: agenda06.pdf; Technology workshop attendees.xls

Chuck: Here is an agenda and contacts regarding the technology workshop that was done last year. It will give you an idea of what types of technologies are being developed by industry and gov.

As you know, our exercise is on 7 June at NBSD. Don
==========
RE: Oil Spill Response Technology Assessment
From: Devereaux, Kelly W. CIV CNI [kelly.devereaux@navy.mil]
Sent: Tuesday, April 24, 2007 8:58 AM
To: Katz, Chuck SPAWAR
Subject: RE: Oil Spill Response Technology Assessment

Navy Region Midwest, Great Lakes, Illinois will be participating in and hosting a Spill of National Significance exercise (SONS07) June 19-21, 2007.

Kelly Devereaux
NOSC Program Manager
==========

RE: Oil Spill Response Technology Assessment
From: Costello, Martin CIV CNRMA Env [martin.costello@navy.mil]
Sent: Wednesday, April 25, 2007 8:21 AM
To: Katz, Chuck SPAWAR
Subject: RE: Oil Spill Response Technology Assessment

Chuck,

Nice talking with you yesterday. I had thought that I had a report describing our recent Spill Management Team Tabletop exercise and Internet use but the report only notates its use but does not go into details. Use of the Internet for

this purpose could be a good think provided up-to-date information could be maintained in real time . At a minimum, it would be a great situational unit display tool.

I googled "PISCES Spill Modeling" and pasted in part the below regarding this software application... Don't know what you could gather from this but, we as NOSCs could use something like Pisces for training and perhaps actual responses.

Again, nice chatting with you and look forward to working together on this endevor.

R/Marty Costello
CNRMA NOSC Representative

When delivered to the U.S. COAST GUARD in 1998 PISCES was specifically designed to create and conduct oil spill response exercises from a single PC workstation. PISCES 2 is the second generation of this application, greatly enhanced from the original product: Now multi-incident capable, Not limited to spill scenarios, Real-time simulation of any incident in which large numbers of resources are activated / tracked, Network deployable –hard-wire or wireless network connections and over the Internet, Auto-load tidal current or surface current data from an extensive internal database for the scenario date and time,
Input weather and water current data to an active scenario from Met-Ocean buoys offshore

-----Original Message-----
From: Katz, Chuck SPAWAR
Sent: Tuesday, April 24, 2007 11:41
To: Costello, Martin CIV CNRMA Env; Davenport, Mike CIV CMDR Navy Region SE; 'kelly.deveraux@navy.mil'; Schultz, Mark NAVRESFOR; Montoro, Don N CIV; Cruz, Tito F CIV NAVSTA San Diego; Brown, Tammy CIV PSNS, N45RO2; Hayes, Dan CIV COMNAVREGNW Environmental N45; Pang, Cynthia Y CIV NAVREGHAWAII, N45; 'hoovera@guam.navy.mil'; 'ross.lonnie@cnrfe.navy.mil'; 'laitila.jeffrey@cnrfe.navy.mil'; 'courtneyt@cfac.cnfk.navy.mil'; 'n44E@cnfk.navy.mil'; 'dominic.broadus@cnre.navy.mil'; 'awni.almasri@me.navy.mil'

Cc: Blodgett, Wayne CIV CNIC HQ, N45; Curtis, Stacey SPAWAR; Andrews, John SPAWAR; Gauthier, Ron SPAWAR
Subject: Oil Spill Response Technology Assessment

Dear NOSC-

As you may be aware from Wayne Blodgett's previous email, the Navy's Pollution Abatement Ashore (PAA) program (www.paa.navy.mil) has tasked SPAWAR Systems Center San Diego to identify and prioritize where innovative and cost-effective technologies can be brought to bear on oil spill prevention, detection, and response. The outcome of this tasking is to help the PAA program align its future research investments with your requirements. This effort really needs to start with each of you in helping us identify your needs and where you believe technology investments can provide new or improved capabilities. Though we plan to contact each of you directly over the next couple of months to discuss your ideas, we would be very grateful if you could let us know now if you have any spill drills, tabletop exercises, or similar activities occurring in your region between now and the end of August so that we may plan to attend as observers. Being able to attend these exercises affords us an important opportunity to review the unique capabilities and needs of each region.

We thank-you in advance for providing us future dates on drill activities. And please do not hesitate to contact us at any time to discuss ideas you may have.

v/r Chuck Katz

Chuck Katz, Oceanographer
Environmental Sciences Branch
SPAWAR Systems Center (SSC) San Diego, Code 2375
53475 Strothe Road

San Diego, CA 92152-6310
Voice: 619-553-5332
Fax: 619-553-6305
Cell: 619-301-7643
Email: chuck.katz@navy.mil
~ ~ ~ ~ ~ ~ ~ ~ ~ ><((((º> <º))))>< ~ ~ ~ ~ ~ ~ never follow

NOAA oil spill project review
From: Richter, Ken SPAWAR [ken.richter@navy.mil]
Sent: Friday, April 20, 2007 2:00 PM
To: 2375all@spawar.navy.mil
Subject: NOAA oil spill project review

Hi all - I went to a rather lackluster public review of projects NOAA is funding which evaluate monitoring and risk assessment of oil spills. This funding ~ $1.2M is administered jointly by NOAA and University of New Hampshire in a program called the Coastal Response Research Center. Since it funded EPA, business and academics, I would guess we could partner and go after funds as well. The main thrust is oil spill preparation via models, response, and post-spill assessment. A science advisory panel (5 members) as well as NOAA contacts, guide the PI's work. Most questions were left to the SAP members, while there were perhaps 50, mostly NOAA people in the audience. I thought I'd share my notes of the one day meeting reporting interim progress, held at NOAA's facility in Seattle on 4/19/07. Below are notes from the more interesting talks, sometimes combined with the 4 posters that were also presented. I'll skip reviewing several talks on the mechanics of coming to a public consensus on evaluating an oil spill's economic impact or the public's perception of the correct approach in dealing with an oil spill. Polls showed that public consensus was hard to reach, other than one paper I mention below.

High frequency radar observations of surface currents for oil spill tracking: This was the first and probably best paper. Work off of Pt Loma with dye, aerial mapping, GPS drogues and CODAR (the radar) were combined to compare the drogues vs CODAR for indicating where the dye would go. Drogues won. However the surface layer, which CODAR looks at, moved south while the mixed layer, where the dye was, moved east. CODAR should be more useful for surface oil that does respond to wind. CODAR can detect movement down to around 10 cm/sec. The Coastal Conservancy and other organizations is putting in a CODAR fence from Alaska to Mexico that will eventually be able to send data in real time to hydrodynamic models as well as oil spill response teams. Real -time data is available now off San Francisco and San Diego. I have names and telephone numbers.

Dispersants were examined for their effect on oil droplet size when coupled with different wave energy. This was a wave tank experiment. Breaking waves break up oil into small ~ 10 um droplets and dispersants help in the process.

Oil droplets tend to get covered by suspended sediment particles when they are present (e.g. near shore area where a ship has gone aground in big waves) and this helps pull the oil droplets to the bottom. Dispersants tend to aid in this process, but it's not clear why. The biggest effect in enhancing particle coating is when the particles are relatively large (> 5 um) and low in organic carbon. This was another interesting talk. It is not clear what effect the dispersants have on the resuspended sediments.

Corals and sea anemones seem to be pretty immune to realistic concentrations of oil and oil dispersants. LC50 values were 30 to 250 ppm for the dispersant, higher for the oil. There was a nice mention of sublethal coral and anemone behavior - tentacle waving - that seemed to be a good indicator of insipient damage.

Turtle eggs and development - snapping turtles - are bomb proof to oil on the beach trickling down through the sand. This surprised and delighted a lot of the audience. The author is going to work next on the permeability of marine turtle egg shells.

One interesting sociology/economics type talk involved polling people to determine what it would take to replace Padre Island (a long barrier island off Texas near Corpus Christi). There are several smaller barrier islands nearby. In order to make them as equally attractive as Padre Island, the substitute islands would (1) have to be mechanically cleaned, (2) car free) and (3) have lifeguards and bathrooms. Negative features included concession stands (surprisingly), distance, crowds, etc. The author was trying to put a monetary value on loss of recreational resources in the event of a an oil spill

off Padre Island. I was thinking that a similar study (884 people in a questionnaire) could be used to justify bacterial-loading reductions in southern California.

That's pretty much it. This is the 5th year of the program and these reviews seem to occur in a different region each year.

From: Pang, Cynthia Y CIV NAVREGHAWAII, N45
Sent: Tuesday, March 27, 2007 11:10 AM
To: Katz, Chuck SPAWAR
Cc: Andrews, John SPAWAR
Subject: RE: Booming Scheme for Port Allen and Oil Spill Ideas
Hi Chuck,

Great idea re: sit maps. Hadn't thought of that aspect. The laptop should be a tablet PC with drawing capability with a stylus. The IC can complete the ICS 201 form, draw the intial sit map then email to the command center. What would also be nice is being able to teleconference from the field to the command center. A PC with camera capability to do this. Once the ICS 201 is sent to the command center, the IC can talk to the command center via the PC camera and explain what's going on.

Satellite phones would also be helpful in case the cell phone towers are out.

I'll jot down some things to consider then give you and John a call.

I found the brochure on the plane. There's different models. The website address is www.avinc.com.

On another note, sometime within the next few months, I'm planning on getting folks together to discuss the response to the USS Arizona. Then later, I'm hoping to get a group together to discuss the other issues associated with the Arizona. If you or John are interested in attending the meetings, please let me know.

Thanks,
Cynthia

-----Original Message-----
From: Katz, Chuck SPAWAR
Sent: Tuesday, March 27, 2007 5:02
To: Pang, Cynthia Y CIV NAVREGHAWAII, N45
Cc: Andrews, John SPAWAR
Subject: RE: Booming Scheme for Port Allen and Oil Spill Ideas

Cynthia-

You've hit upon something that we here have thought might be a useful tool for responders. We felt that this could be useful for better communication between responders and the command center. This could facilitate sending situational awareness maps back to the field for validation or possibly doing real-time updating for the command center. I can think of a bunch of things that this could be useful for including setting up cameras for getting visual info back to the command center (this would include aerial, boat mounted, or shore mounted cameras). While we here may have a whole bunch of ideas, it's more important to have you give us your ideas on what you think you need to better respond. As a starting point maybe you can jot down some of these ideas and then John and I can chat with you and try to flesh out some of the details with you on the phone. We should do this while things are still fresh for me from the drill and while they are still churning in your head (but I'd guess they always are with you!!). After you get some of these down on paper, send them along in an email, and John and I will get back to you shortly after to discuss.

Regards the radio controlled airplane: John is actually trying to get his hands on one (same one tested in Hawaii) to add to his robot pool for testing. As you can guess, because of their price tag, the purchase is a bit difficult and a drawn-out process so it might take a while. However, we certainly can propose to the R&D program (or others) to test its use for the purpose of viewing a spill- a perfect use for John's new robot when he gets it.

Talk to you soon.

Chuck

-----Original Message-----
From: Pang, Cynthia Y CIV NAVREGHAWAII, N45
Sent: Monday, March 26, 2007 6:19 PM
To: Katz, Chuck SPAWAR
Subject: RE: Booming Scheme for Port Allen

Hi Chuck,

Looks promising. I will discuss further with the State and if it's a go then I'll have our engineers work something up. Great idea.

On another note, you had mentioned laptop computers for the spill response program. Not sure if you mentioned remote internet access while in the field. If not, this is something that is really needed. NMCI just doesn't work for us because of their firewalls and other restrictions. With the computer there should also be annual upgrades, maintenance, ability to procure non-NMCI software/equipment, etc. It takes us too long to go through the IT paperwork to have them procure items even those that are not connected to NMCI computers.

It's been over 3 months and I'm still waiting for a portable printer and wireless keyboard for a non-NMCI computer.

Also, do you think the radio controlled airplane is a possibility to assist us in shoreline assessments? It would also be useful to obtain aerial views during an oil spill to see where the oil has spread to.

Cynthia

-----Original Message-----
From: Katz, Chuck SPAWAR
Sent: Monday, March 26, 2007 13:33
To: Pang, Cynthia Y CIV NAVREGHAWAII, N45; Burger, John CIV PMRF
Subject: Booming Scheme for Port Allen

Cynthia, John-

I am attaching a pdf file that has an idea for booming ops at Port Allen with additional pictures I took. I think this idea would work for you as long as the proposed structure does not extend out too far from the wooden slats to ensure that the vessels don't shear them off while docking and undocking. You may need to beef up the bumpers in those locations. Let me know what you think.

Chuck

FYI.

Cynthia

-----Original Message-----
From: Blodgett, Wayne CIV CNIC HQ, N45
Sent: Friday, March 02, 2007 6:19
To: Anthony Hoover; Pitchford, Clark A. CIV COMNAVREGNW N45RO; CourtneyT@cfac.cnfk.navy.mil; Pang, Cynthia Y CIV NAVREGHAWAII, N45; Byerly, Didi R CIV NAS Corpus Chirsti,; dominic.broadus@cnre.navy.mil; Montoro, Don N CIV; Devereaux, Kelly W. CIV CNI; Costello, Martin CIV CNRMA Env; Tucker, Michael S CIV

NAVFAC NW, ENVIR COMPLIANCE TM; Davenport, Mike CIV CMDR Navy Region SE; Conant, Richard CIV Environmental; ross.lonnie@cnfj.navy.mil; Brown, Tammy CIV PSNS, N45RO2
Subject: FW: SPAWAR Systems Center R&D Project on Spill Response

NOSC Reps-

The SPAWAR Systems Center in San Diego has received some R&D funding to look at developing technologies related to spill response. See the message below for more information. I have polled you before about R&D needs and I forwarded your input to SPAWAR. I have also given them the current NOSC Rep POC information. If they contact you we would appreciate it if you could provide input for their project.

thanks

v/r
Wayne A. Blodgett
Environmental Engineer
Commander Naval Installations Command
2713 Mitscher Rd SW, DC 20373-5802
wayne.blodgett@navy.mil
202-433-4513 DSN 288- FAX x0841

-----Original Message-----
From: Andrews, John SPAWAR
Sent: Thursday, December 07, 2006 16:57
To: Blodgett, Wayne CIV CNIC HQ, N45
Cc: Katz, Chuck SPAWAR
Subject: RE: Are you available for a conference call this week?

Wayne,

Thanks for the info.

In brief, Chuck Katz and I have initiated a YO817 funded project with the goal of identifying specific technologies that can be used to improve the spill response tools available to Navy oil spill responders. We are particularly interested in technologies with the potential to enhance information flow, communications, and situational awareness within the Incident Command System. We intend to identify needs that can be readily filled with existing technology to improve overall response effectiveness and efficiency. Over the next several months we will be looking for input from stakeholders and subject-matter experts; we are especially interested in talking with NOSCs and observing spill exercises to gain a better understanding of technology requirements from the customer perspective. We'd appreciate anything you would do to help put us in contact with the right folks. Thanks.

JOHN ANDREWS
SPAWAR Systems Center, San Diego
(619) 553-5577

-----Original Message-----
From: Blodgett, Wayne CIV CNIC HQ, N45
Sent: Wednesday, December 06, 2006 6:20 AM
To: Andrews, John SPAWAR
Cc: Katz, Chuck SPAWAR
Subject: RE: Are you available for a conference call this week?

John/Chuck-

Attached is my current NOSC listing. After we spoke I realized I don't have a NOSC map, so I have attached the latest CNIC region map. Each region has a NOSC and the NOSC AOR corresponds to the region AOR. There is one exception to this. Naval District Washington, which is a CNIC Region, does not have a NOSC. The NDW region is covered by the Mid-Atlantic NOSC in Norfolk.

As we discussed, if you send me a summary of your task, I will broadcast it out to the NOSCs.

r/
Wayne A. Blodgett
Environmental Engineer
Commander Naval Installations Command
2713 Mitscher Rd SW, DC 20373-5802
wayne.blodgett@navy.mil
202-433-4513 DSN 288- FAX x0841

-----Original Message-----
From: Andrews, John SPAWAR
Sent: Wednesday, November 29, 2006 15:10
To: Blodgett, Wayne CIV CNIC HQ, N45
Subject: Are you available for a conference call this week?

Hi Wayne,

Chuck Katz and I were hoping to come out to visit you sometime this week or next but schedules just didn't work out. Would you be available for a conference call sometime later this week?

We would like to talk with you about a new project we're starting; our goal is to identify specific technologies that can be used to improve operational awareness and information availability to Navy On-Scene Coordinators during spill events. We're looking to identify technology gaps that could be readily filled to improve response effectiveness and efficiency. We want to focus our study on a few high-payoff areas; we'd like to get your input regarding areas you think it'd be most beneficial to target in our study.

Are you available tomorrow or Friday? When's a good time? How about if we call you at your office tomorrow (Thursday 30Nov) between 1300 and 1330 EST?

Thanks.

JOHN ANDREWS
SPAWAR Systems Center, San Diego
(619) 553-5577

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From: Montoro, Don N CIV
Sent: Monday, November 13, 2006 3:59 PM
To: Katz, Chuck SPAWAR
Subject: FW: NAVY OHS SPILLS PROGRAM LEAN SIX SIGMA EVENT 23-27 OCT 2006

Attachments: NOSC LSS Event Results EXCOM.ppt
Chuck: I don't think these are specific to what you are involved in but here it is anyway. Don

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From: Blodgett, Wayne CIV CNIC HQ, N45
Sent: Tuesday, November 07, 2006 8:47
To: Anthony Hoover; Pitchford, Clark A. CIV COMNAVREGNW N45RO; CourtneyT@cfac.cnfk.navy.mil; Pang, Cynthia Y CIV NAVREGHAWAII, N45; Byerly, Didi R CIV NRS Environmental; dominic.broadus@cnre.navy.mil; Montoro, Don N CIV; Devereaux, Kelly W. CIV CNI; Costello, Martin CIV CNRMA Env; Tucker, Michael S CIV (EFANW); Davenport, Mike CIV CMDR Navy Region SE; Conant, Richard CIV Environmental; ross.lonnie@cnfj.navy.mil; Brown, Tammy CIV PSNS, N45RO2
Cc: Jatko, Joyce A CIV CNIC HQ, N45; awni.almasri@me.navy.mil; Destafney, Camille R CIV CNRSE N45; Barnett, Cherryl F CIV CNRMA Env Director; Yokota, Clyde K CIV CNRH, N6; Hayes, Dan CIV COMNAVREGNW Environmental N45; Isaac, Kenneth GS-14 (CNRE); Laitila, Jeffrey CIV (CNFJ); Schultz, Mark R. CIV NAVFAC Midwest Environmental; Kennedy, Peter A CIV; Lewis, Thomas NDW; wilsona@nrccsg.navy.mil
Subject: NAVY OHS SPILLS PROGRAM LEAN SIX SIGMA EVENT 23-27 OCT 2006

Greetings-

I wanted to pass on some information from the Lean Six Sigma (LSS) event held a couple of weeks ago. The purpose of the event was to identify opportunities for improvements in the Navy's OHS Spills program. CNIC was represented by myself and three NOSC reps: Don Montoro from Southwest, Tammy Brown from Northwest and Marty Costello from Mid Atlantic. CNO reps included Lou Maiuri, David Price and Lindsay Nehm. NAVFAC reps included Abe Nachabe, Phil Biedenbender and Randall Richter. Other attendees included LT Eaglin from CFFC, Carolyn Winters from PACFLT, Bill Walker from SUPSALV, John Austin from MSC, Fred Touchstone from PCCI, Nick Paraskevas from NAVAIR, Tom Fleming from NAVOSHENVTRACEN, and the 7th Fleet NOSC rep. I'm probably missing a couple of people. Booz Allen Hamilton provided facilitation.

Here are some of the outputs from the event. These are all recommendations at this point, they will need to be chopped as necessary before they are finalized and issued as policy.

"GEO-NOSC" concept - This would realign the NOSC AORs. Current feeling is that the numbered fleet NOSCs do not have the resources to perform the NOSC rep function. Therefore new NOSC AORs would be established that include both the shore areas and the ocean areas. For example, Navy Region Mid Atlantic would take on the 2nd fleet AOR and Navy Region Europe would take on the 6th Fleet AOR. The result would be more a more cohesive arrangement (fewer seams) and better readiness in areas outside our shore facilities. Obviously this will need to be vetted through the Regional Commanders, who would be taking on more responsibility.

Response Plans - The process for the development and update of plans will remain the same: execution by the installations and NOSCs using the EPR process. However, there is a concern over whether our plans are being kept up to date. We will be required to provide oversight by tracking the status of plans at all levels.

Training - The process for providing training will remain the same, centralized funding through the NAVOSH Environmental Training Center for Facility Response Team (FRT) and Spill Management Team (SMT) training courses. However, the SMT courses will be revised to provide a more efficient way to provide Incident Command System (ICS) training with integrated table top exercises. The existing courses will be combined or provided online to make this more efficient. Also, the EPR process will be modified to require justification for training obtained outside the central Navy courses. This will be done through a change to the Guidebook.

Exercises - A central program would be established to plan and execute region level (i.e. NOSC-level) exercises on a three year cycle. SUPSALV (withh assistance from NAVFAC) would be centrally funded to provide this support. The central team would work with the regional NOSC-rep to execute the exercise. The exercise would include a third party (external) evaluation. Based on a three year cycle for these exercises, the team would execute about 5 exercises per year. The idea is that these exercises will provide a consistent approach to worst-case exercises and help to improve readiness in many regions.

Equipment Procurement - These processes will essentially remain the same, procurement by NFESC and SUPSALV (for SUPSALV equipment). NFESC would develop an electronic A2R2 process to replace the current paper process.

Also SUPSALV will perform an analysis to identify the most efficient and effective strategy for staging equipment throughout the Navy. We can expect to be involved in this study.

OHS EPRWeb Module - We have already discussed this amongst the NOSCs and we have a draft "concept" for developing a system. The idea is to provide OHS Spills Program oversight by tracking plans, exercises, training and equipment. This would allow the Navy to understand our readiness posture, and ensure that required actions are being accomplished. It would also provide a tool to the NOSCs and installations for tracking program status.

NOSC Program CONOPS - There was much discussion over the need to provide clearer standards for how we should be providing readiness and response. A CONOPS would provide:

- Planning standards (e.g. What level of response should be provided by each Tier?)
- Training standards (e.g. What training should individuals complete?)
- Performance metrics (how should we measure readiness?)
- Program auditing (how should we be assessing our readiness?)

This is just a short description of the event results, and it probably raises questions in your mind. There will be more information to come on each of these items. As soon as I receive the "official" documentation from the event I will distribute it to you. The attached Powerpoint was developed by N45 after the event and may provide some additional info. Any questions, let me know.

thx

Wayne A. Blodgett
Environmental Engineer
Commander Naval Installations Command
2713 Mitscher Rd SW, DC 20373-5802
wayne.blodgett@navy.mil
202-433-4513 DSN 288- FAX x0841

From: Brown, Tammy CIV PSNS, N45RO2
Sent: Wednesday, July 26, 2006 8:55 AM
To: Katz, Chuck SPAWAR
Cc: Andrews, John SPAWAR
Subject: RE: Advanced Oil Spill Technologies Project

Below was my response to this data call...I really can't think of any better way to target technologies that would work within the ICS and to communicate information and data to the ICS. In NRNW, we already use an electronic system (eCard, developed by Genwest), but would be happy to talk to you about what you need to work on.

From: Brown, Tammy CIV COMNAVREGNW N45RO2
Sent: Wednesday, March 22, 2006 13:48
To: Blodgett, Wayne CIV CNIC
Cc: Montoro, Don N CIV
Subject: FW: Spill Response Needs Input

Well, thanks for asking!

Here are some ideas from the Northwest; the first two involve needs identified by the Coast Guard and WDOE after the last few spills in Washington; it appears most people I asked really need some way for tracking oil on water, especially at night!

The foremost idea is for improving oil spill assessment capability. Simple assessments and complex assessments using aerial visual, IR, and UV could be greatly enhanced by calibrating using ground measurements. Oil film thickness for thicker slicks is largely unknown based on spectral analysis (visual, UV, IR). However, if these measurements were coupled with on water assessments, they would be of much greater value. A device is needed to measure average spill thickness based on discrete transects conducted by on water assessment teams.

Design:
Would include a flow meter or some other type of water speed measurement, GPS, transect collection device, and measurement device (s). Oil from transects could be measured directly, physically extracted from sorbents and measured, or for fine measurements might also include an extraction kit and fluorometery, needed to remove residual oil from collection device.

1) Aerial team makes observation of potentially oiled areas
2) Transect teams are directed by aerial observer to area of interest to determine presence of oil and or slick thickness
3) This data is then used to calibrate aerial observations to estimate areas of greatest concentration (for directing response or to estimate spill volume to evaluate potential impacts)

Second, develop a common operational picture for the spill. I believe this could be done using Automated Information System (AIS) transponders mounted on all of the vessels involved in the clean up effort. AIS with blue force locator and ICAN software is capable of creating a UNCLAS COP. If maintained at the UNCLAS level the COP could then be disseminated to all agencies involved in the response effort and provide a geographical picture for the command team to monitor and direct operations.

Third, develop an airborne sensor to detect the boundaries of an oil spill in all lighting or weather conditions. The sensor could work on refracted light like a LIDAR or possibly a low power Inverse Synthetic Aperture Radar to detect changes in sea surface wave patterns (smoother / less chop would equal oil spill boundary). This capability would improve response times dramatically

Fourth, UV oil detection lights-the shipyard had some comments:
After playing with the other oil sensors, I am not keen on system solutions. I would favor small devices that we could deploy locally. Maybe they could work on a portable system that we could set up with our projects and home ported ships. The light to could tie into a phone system to the quarterdeck or to a project office so they could investigate (auto dialers are pretty inexpensive). The other option would be to just have the portable UV detector plug into an outlet and trigger a flashing light. If they could make the system cheap and portable, I could buy one or two a year until I had the entire facility covered.

Other ideas: For tracking a spill at night, how about some cheap, flat, pad like device that we can throw in the water in several places and let float with the oil. The device would respond like diesel or JP and move with the oil. It could have some highly reflective coating or maybe even a little flashing device so we could spot it right away.

How about making a better oil absorbent pad that could even pick up a sheen.

How about a device that we can easily attach to our work boats so they could pick up oil when they towed boom or a skimmer (I have NO idea what that would be like!)

How about a portable, high powered, LED lighting system that can be attached to workboats and operate of the the 12-volt system and also be used ashore and run off 12 volt or 110 power. (We could hook them up to our cars, or spare batteries...or a long extension cord).

How about an easy tool or handheld device that we can take a sample of the oil from the sheen and it will tell us what type of product it is? Or how about a portable fingerprinting system that we can use ourselves instead of sending to a lab?

How about some tool that will allow us to take the temperature of the water, record the ambient temperature, record the wind and make some predictions about the spill evaporation rate.

How about a handheld device that let's us input type of oil, amount of oil, length of time of discharge, and coordinates of discharge, and then it will do automatic spill predictions based on actual tide and winds.

I could picture a lot of cool electronic tools that could be developed into portable devices and speed up the info flow so we don't need to rely on NOAA, as they won't always be available....

-----Original Message-----
From: Blodgett, Wayne CIV CNIC
Sent: Friday, March 17, 2006 10:38 (snipped; see entry below for rest of this data call from Blodgett to the NOSCs)

From: Katz, Chuck SPAWAR (continues the rest of Tammy's string)
Sent: Thursday, July 20, 2006 14:26
To: Brown, Tammy CIV COMNAVREGNW N45RO2
Cc: Andrews, John SPAWAR
Subject: Advanced Oil Spill Technologies Project

Tammy-

I was involved in soliciting "user needs" through Wayne Blodgett for NAVFAC's P2 Ashore R&D Program (0817) a couple of months back. The 0817 program manager asked us to write up a proposal that would, in the first year, evaluate what technologies might be brought to bear on improving spill response. I remember your vocal and enthusiastic responses to the "needs" and thought that it would be very useful for us to get input from you on this topic. Ideally we would sit in on an oil spill drill but I understand you just completed one. We are targeting technologies that would work within the ICS and in communicating information and data to the ICS. Funding would not come to us to perform anything formally until after the start of the fiscal year but we would find it helpful if we could informally discuss what you thought might be a good mechanism for this process, especially when there is no drill opportunity to sit in on.

v/r Chuck Katz

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From: Montoro, Don N CIV
Sent: Wednesday, June 07, 2006 11:29 AM
To: Katz, Chuck SPAWAR
Subject: RE: After the Oil Spill Drill

Chuck: It was great to have you attend and I'd welcome the support. Let me know if there is anything you need from me to get buy-in from your command. The only thing I would ask is that when we do have training and exercises that they are a priority on your schedule (once a year usually for a day or two). Thanks again, Don

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From: Katz, Chuck SPAWAR
Sent: Wednesday, June 07, 2006 11:17
To: Montoro, Don N CIV; Gordon, Brian S CIV
Cc: Chadwick, Bart SPAWAR
Subject: After the Oil Spill Drill

Don-

I'd like to thank-you for allowing me the opportunity to participate in the two-day training and spill drill just completed. I'm not so sure that I brought anything new to the table on this first go-round but I learned a lot. I can see the benefit of having as many people trained up on this type of effort in the event you get a real spill that goes days into weeks. I am willing to take on future training and participation in future drills as a collateral duty if I can get buy in from my command and if you are willing to include me.

I took away a lot of new knowledge from this short two-day event. As you are aware, we have some proposals on the table with NAVFAC that relate to bringing new tools to bear on oil spills. I hope to translate this experience into better tools and/or processes that support the ICS.

cnk

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From: Kyburg, Christopher SPAWAR
Sent: Wednesday, June 07, 2006 1:59 PM
To: Katz, Chuck SPAWAR; Chadwick, Bart SPAWAR; Andrews, John SPAWAR; Lapota, David SPAWAR; 'Mike Putnam'; Wang, Pei-fang SPAWAR; Richter, Ken SPAWAR
Subject: RE: Oil Spill Drill - some lessons learned, ideas

Thanks Chuck, great run down.

It sounds much as I had expected: there is a large information management component to the problem. There is need (going unfulfilled) to aggregate contextual information and near real time information from a variety of sources. This is what SSC SD is chartered to do. My suggestion is to have us provide a web accessible system they can use that will do the aggregation for them. This could integrate spill sensor information (much of the design work for integrating oil spill buoy data was done for Dave's buoys) as well as model output.

R

Chris

-----Original Message-----
From: Katz, Chuck SPAWAR
Sent: Wednesday, June 07, 2006 12:01 PM
To: Chadwick, Bart SPAWAR; Andrews, John SPAWAR; Kyburg, Christopher SPAWAR; Lapota, David SPAWAR; 'Mike Putnam'; Wang, Pei-fang SPAWAR; Richter, Ken SPAWAR
Subject: Oil Spill Drill - some lessons learned, ideas

Guys-

While I still have this fresh in my mind I thought I'd ramble a bit about some things I took away at yesterday's oil spill drill. This may end up a bit cryptic but we should probably have a sit-down and discuss...so this may serve me to better explain stuff!

The Incident Command System has numerous components and activities that go on simultaneously with a variety of groups. I was tasked as an environmental technical specialist yesterday supporting the Planning Section.

Some things our group ran into yesterday where I think we could bring some impact to:

The lack of electronic tools (computers, software, forms, visualization) for mapping out areas identified in the Area Contingency Plan (ACP) or the SD Bay INRMP
The lack of timely reporting methods by teams from the field
The inability to easily view information developed by the Situation Team (where is the spill, where are the booms, where are the boom boats now)

The inability to overlay situation data with natural resource and/or economic resource data for planning purposes
The inability to truth the spill trajectory
The inability to modify spill trajectory after booms are deployed (we spoke to an ops guy who wondered why we were using trajectories that took the oil west the next day when he was going to "capture it all" before then!

Some suggestions made (some mine) include:

1) Develop a wireless hotpsot for connecting multiple information together
2) Provide "spill kits" that contain laptops (with electronic reports, forms, access to Web versions of similar, and software for connecting/viewing and data sharing), hardcopies of important documents, interconnect capabilities, fax capabilities (via cell phone?)
3) Use software and projector for the Situation Group... maybe with a smart board for "writing" on top (for spills of National significance, NOAA comes in with this kind of stuff) vs. transparency map that can be erased and updated
4) Stand up a dedicated command center (we had 70 people there yesterday and it was not a good physical or electronic setup)

Mitch Perdue (and I) see a need and a role for us whereby we become a centralized repository of all the data (multiple GIS and databases, reports, forms, links etc.) as well as spill modeling (while NOAA would be used in a huge spill, on smaller ones, they might only get called). Maybe we collate data and provide the "spill kits" and support of visualization and display of model trajectories.

On the sensor side-I see these more from a validation role. How much of the spill is where now? Maybe they can be deployed near sensitive areas at the onset of a spill to be warning devices? Maybe they get deployed at expected trajectory locations to confirm speed of travel to match to model??

More to discuss. I'll only be here Monday of next week if you guys want to chat as a group. Let me know your interest in doing this.

cnk

<< File: PortAllenBooming.pdf >>

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From: Montoro, Don N CIV
Sent: Wednesday, June 07, 2006 11:11 AM
To: Montoro, Don N CIV; Samuelson, Sam CIV; Joseph, Ken M CIV; Eldredge, Daniel E LCDR RLSO SW BROADWAY ENVIRONMENTAL; Perdue, Mitchell A CIV NAVFAC SW; Guieb, Ruben A CIV NAVFAC SW; Matthews, Audie CDR CNRSW Port Operation; Williams, Dwayne E LT CNRSW, Port Operations; Richards, Bryan L. ENC NAVSTA 150, 1, main; Hanna, David CWO3 PORT OPS; Perez, Luis CIV NAS North Island/ Environmental, N45; Graulau, Christina CIV MPH, REHS; Collantes, Ricardo F BM1 NavSta San Diego ,N32MP/N32M3B/N32M3BW; Kanaski, Timothy W CIV FORCE PROTECTION/FED FIRE, ; Johnson, Dean R CIV SEALOGPAC; Phillips, Michael D. (Air Ops); Larson, Jan K CIV; Brock, Kelly CIV; Chichester, Rob A CIV; Cruz, Tito F CIV; Coler, James A CIV (CNRSW); Lunsway, Lee A CIV (CNRSW); Hicks, Harry M CONT; Smith, Suzanne M CIV (CNRSW); Gordon, Brian S CIV; Conkle, Tamara S. CIV (CNRSW Environmental Dept.); Hejko, Greg P CIV; Palmer, Robert L CIV NAVFAC SW; Yatsko, Andy CIV NAVREGSW N45JNWAY; Edson, Mark A CDR; De la fuente, Luis CIV; Eliff, Christopher B CWO3 NAVSTA San Diego, N32; Norris, Mary CIV; Mueller, William K LT NavSta San Diego, Port Ops; Schmitt, Jason T CIV NAVFAC SOUTHWEST; Steinway, Graciela R CIV NAVFAC SW; Go, Bienvenido R EMCS CNRSW, N32; Cordova, Allen L BMC CNRSW, Scheduling; Liburd, Anderson A BM2 SWRMC ,937D; Eliff, Christopher B CWO3 NAVSTA San Diego, N32; Walker, Lorien S CTR CNRSW, N45; Esquibel, Lew R CTR NAVSTA San Diego, N32; Le, Khoa T CIV NavSta San Diego, N32MPW; Katz, Chuck SPAWAR
Cc: Smith, Dixon CAPT NAVBASE SAN DIEGO, CO; Patton, Mark D O-6 Naval Base Point Loma, N00; Alexander, Townsend G CAPT CNRSW; Herrick, Craig L CAPT, FISCSD, XO; Lester, Frank CIV Force Protection

Program Manager; Zahorbenski, Theodore S CIV SPAWAR Old Towne; Kennedy, Peter A CIV; Trevino, Rene CIV CNRSW; Hering, Len R RADM; rlewis@ospr.dfg.ca.gov; JAltendorf@d11.uscg.mil; Kelly.Dietrich@uscg.mil; judy_gibson@fws.gov; joet@actisd.com; walkerwa@navsea.navy.mil; pricolaml@essmnavy.net; Walter Nordhausen [wnordhau@OSPR.DFG.CA.GOV]; 'stmanuel@nrces.com'; MSRC (lynchp@msrc.org); Anthony.S.Lloyd@uscg.mil
Subject: RE: CNRSW Triennial Worst Case Discharge Training and Exercise 5, 6 June 2006

Attachments: ICS 202.doc; 201.doc
Exercise Participants (Navy, USCG, OSPR, USF&W, SUPSALV, MSRC, NRC Environmental and ACTI):

I could not be more pleased with your effort and performance at yesterday's oil spill exercise. Your energy and determination to successfully complete the objectives were noteworthy. I cannot recall an exercise where an Incident Action Plan (IAP) was completed to the level of completeness with this degree of complexity in the amount of time you had.

I reviewed the check-in sheet and we had over 70 people participating including Navy Active Duty, Navy Civilians, USCG, State, US Fish and Wildlife, Navy SUPSALV, and three oil spill response companies. I'm pleased CAPT Smith and CAPT Strangfeld could see you in action. From the debrief, I think it is safe to say, that we all felt it was a valuable experience and we learned that it is a team effort, not only within the Navy, but with other federal, state and local agencies as well as industry. I appreciate the way that we all worked so effectively together because this is what we would need to do in a real spill event. The relationships and trust we develop in exercises will be invaluable in a real event. I received many favorable comments from federal and state participants regarding the exercise and Navy professionalism as well as many from Navy personnel as to how valuable it was to have the knowledge and professionalism of USCG, State, F&W, and industry personnel. The Coast Guard mentioned that they will investigate taking credit for an Area Exercise because it was a comprehensive scenario, addressed the pertinent issues, included the most significant response agencies and industry and, frankly, we just did a good job.

My confidence level in our ability to manage a Worst Case Discharge has gone up exponentially since yesterday. However, there are a few positions that could use additional depth and, over the next several months, I will be working with the various program directors to identify optimal staffing levels and the desired level of training for each ICS position. I would appreciate your recommendations.

I have attached copies of the ICS 201and 202 for souvenirs. I will review the IAP you produced as well as the lessons learned comments and incorporate them into the revised NOSC plan. If you have any additional thoughts or if you would like to discuss the exercise, training, etc., please give me a call.

Again, thanks and congratulations on a job well done. Please pass on my sincere thanks to your staffs. Best regards, Don

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From: Montoro, Don N CIV
Sent: Wednesday, May 31, 2006 16:01
To: Montoro, Don N CIV; Samuelson, Sam CIV; Joseph, Ken M CIV; Eldredge, Daniel E LCDR RLSO SW BROADWAY ENVIRONMENTAL; Perdue, Mitchell A CIV NAVFAC SW; Guieb, Ruben A CIV NAVFAC SW; Matthews, Audie CDR CNRSW Port Operation; Williams, Dwayne E LT CNRSW, Port Operations; Richards, Bryan L. ENC NAVSTA 150, 1, main; Hanna, David CWO3 PORT OPS; Perez, Luis CIV NAS North Island/ Environmental, N45; Graulau, Christina CIV MPH, REHS; Collantes, Ricardo F BM1 NavSta San Diego ,N32MP/N32M3B/N32M3BW; Kanaski, Timothy W CIV FORCE PROTECTION/FED FIRE, ; Johnson, Dean R CIV SEALOGPAC; Phillips, Michael D. (Air Ops); Larson, Jan K CIV; Brock, Kelly CIV; Chichester, Rob A CIV; Cruz, Tito F CIV; Coler, James A CIV (CNRSW); Lunsway, Lee A CIV (CNRSW); Hicks, Harry M CONT; Smith, Suzanne M CIV (CNRSW); Gordon, Brian S CIV; Conkle, Tamara S. CIV (CNRSW Environmental Dept.); Hejko, Greg P CIV; Palmer, Robert L CIV NAVFAC SW; Yatsko, Andy CIV NAVREGSW N45JNWAY; Edson, Mark A CDR; De la fuente, Luis CIV; Eliff, Christopher B CWO3 NAVSTA San Diego, N32; Norris, Mary CIV; Mueller,

William K LT NavSta San Diego, Port Ops; Schmitt, Jason T CIV NAVFAC SOUTHWEST; Steinway, Graciela R CIV NAVFAC SW; Go, Bienvenido R EMCS CNRSW, N32; Cordova, Allen L BMC CNRSW, Scheduling; Liburd, Anderson A BM2 SWRMC ,937D; Eliff, Christopher B CWO3 NAVSTA San Diego, N32; Walker, Lorien S CTR CNRSW, N45; Esquibel, Lew R CTR NAVSTA San Diego, N32; Le, Khoa T CIV NavSta San Diego, N32MPW
Cc: Smith, Dixon CAPT NAVBASE SAN DIEGO, CO; Patton, Mark D O-6 Naval Base Point Loma, N00; Alexander, Townsend G CAPT CNRSW; Herrick, Craig L CAPT, FISCSD, XO; Lester, Frank CIV Force Protection Program Manager; Zahorbenski, Theodore S CIV SPAWAR Old Towne; Kennedy, Peter A CIV; Trevino, Rene CIV CNRSW; Hering, Len R RADM
Subject: CNRSW Triennial Worst Case Discharge Training and Exercise 5, 6 June 2006

As you are aware, our Triennial Worst Case Discharge Exercise takes place on 6 June 2006. The scenario will include a large discharge in the Bay with a potential for human health, environmental and property injury. Training will take place the day before on 5 June 2006.

I have assigned personnel to the following positions in the Unified Command. The Coast Guard and State will supplement the UC with their personnel. The State will provide personnel in planning, environmental unit, wildlife protection, safety and NRDA. In addition to the USCG Sector Commander and Deputy, the USCG will provide personnel in Operations, situation unit and resources unit. There will also be one or two Fish and Wildlife representatives as well as SUPSALV, MSC, NRC Environmental (contractor), ACTI (contractor) and MSRC (contractor). I've also arranged for two members from the US Coast Guard Strike Team to serve as coaches for the planning process.

June 5, 2006: Training on the ICS Incident Action Planning Process will be conducted at the NAVOSH Training Center Bldg 3232 (Dry side), NB San Diego starting at 0800. A map is attached. This is important to refresh ourselves on the process. A few of you have expressed that you will not be able to make this training. Other than those that have advised me, I will assume that unless otherwise informed, you will be attending both days.

June 6, 2006: The exercise will be held at Bldg 150 Port Ops, NB San Diego. Check-in will commence at 0715 and the exercise will commence at 0800 sharp. Please be checked in by 0745. We will not be breaking for lunch and I haven't figured out how to pay for lunch (other than my personal credit card) so bring whatever sack lunch or food you will need to sustain yourself for the entire day 1700.

I have not received confirmation from a number of you so please do so ASAP.

We'll get out of this what we put into it, so please come ready to participate and learn.

Call me if you have any questions or concerns.

Best regards, Don Montoro 556-3135

COMMAND STAFF:
Navy Incident Commander: Don Montoro
Information Officer: Sam Samuelson
Safety Officer: Ken Joseph (Safety); Val Ille Nav Med IH
Liaison Officer: None
Legal: LCDR Dan Eldredge
Natural Resource Damage Assessment: Mitch Perdue, Rubin Guieb, Lawrence Honma (CONT); Dan Eldredge

OPERATIONS SECTION CHIEF: CDR Matthews (Port Ops)

Recovery and Protection Branch: LT Williams (Port Ops)
Protection Group: Chief Richards (Port Ops)
On-Water Recovery Group: CWO4 Hanna (Port Ops)
Shoreside Recovery Group: Lou Perez (ENV)
Disposal Group: Christina Graulau (ENV); EMCS Go (Port Ops)

Staging Area: BM1 Collantes; EN1 Hill (Port Ops)

Emergency Response Branch Asst: Battalion Chief Kanaski
Salvage Group: None (Although MSC will be conducting a simulaneous exercise that will involve Salvage)
Law Enforcement Group: TBD (Force Protection)
Air Operations Branch Support: CDR Phillips (By phone)

Wildlife Branch: Jan Larson, Kelly Brock (ENV)
Recovery Group: As assigned (ENV)

PLANNING SECTION CHIEF: Rob Chichester (ENV)

Situation Unit: Tito Cruz, Jame Coler (ENV)

Resources Unit: Lee Lunsway (ENV); Harry Hicks; Chief Cordova (Port Ops)

Documentation Unit: Summer Walker (ENV)

Environmental Unit: Brian Gordon; Asst: Tammy Conkle (ENV)
Shoreline Cleanup Assessment Team: Greg Hejko, Rob Palmer (NAVFAC)
Historical/Cultural Resources: Andy Yatsko (ENV)

Demobilization Unit: CWO Inness; EN1 Hill (Port Ops)

LOGISTICS SECTION Chief: Mark Edson (Env)

Support Branch: Luis De La Fuente (FISC); CWO3 Eliff (Port Ops)

Service Branch: Chief Harris (Port Ops)

FINANCE/ADMIN SECTION CHIEF: Suzanne Smith (Env); LT Mueller (Port Ops) Mary Norris (by phone, N8)

Time Cost Unit: Lew Esquibel, Khoa Le (Port Ops);
Procurement Unit: Jason Schmitt, Gracie Steinway (NAVFAC Contracting)

From: Chuck and Laurie Katz [clkatz@cox.net]
Sent: Monday, March 27, 2006 8:01 AM
To: Blodgett, Wayne CIV CNIC
Cc: Katz, Chuck SPAWAR
Subject: Needs

Wayne-

Here's two ideas that I tried to capture from the "needs" identified in the emails. Please feel free to modify if you think they can be improved to better match what was said in the emails. I can be reached early this morning on my cell phone at 619-301-7643. After 1030 you can try me on my office phone at 619-553-5332. I decided to just send this from my home email (no waiting for NMCI to boot!) so please respond to all if you do respond.

Thanks again...cnk

Better Sensors/detection for Oil Spill detection

Problem: Oil spills need to be reduced/stopped before they get big. Once a spill happens, recovery teams need better sensors to track where the oil is.

Spill response teams need the ability to locate and track the magnitude and thickness of spilled oil during the night or during high sea state conditions when visibility from small boasts is reduced. This would include automated and/or hand held sensors that could be used by personnel within oil booms during nighttime fueling operations to identify when a sheen develops and alert the fueling crew to stop. This could also include a ruggedized sensor that could be easily deployed on small recovery vessels that would be used to measure and map out where and what type the oil is and provide better information to the spill team on where to set up recovery equipment.

The solution could include hand held UV lights for identifying sheens, calibrated fluorometers deployed on boats that can measure and map oil concentrations, sensors integrated into security and/or oil boom systems, or sensors deployed on free-floating drifters that float along with the oil that provide information on where the oil is moving. Another option would be to have some sort of aircraft mounted sensor that could quickly map the spill from the air.

Better Management/Modeling for Oil Spill Detection

Problem: Once an oil spill occurs, the recovery team needs better tools to track and manage the recovery effort.

Once a spill occurs, the recovery team needs to optimize where it deploys its resources to minimize the spread and damage of the spill. Better management tools could include a better way to track and predict where the oil is going as well as track and deploy recovery boats to the right locations.

The solution could include better predictive models that use information on actual conditions (wind, tide, sea state, type of oil, starting location, actual oil measurements) to best predict where and how fast the oil is likely to spread. The solution could also include integrating weather, oil spill, and boat security transponder systems into a geographical picture of the spill that would give the command team the ability to monitor and direct operations.

---

placeholder for 032206 VTOL email (embedded in Blodgett 032306), just a broken email, unsure whether Tammy Brown's idea or she simply passed from the ice-breaking oil skimmer dealer Lakosh

==========

From: Davenport, Mike CIV CMDR Navy Region SE
Sent: Friday, March 17, 2006 5:02 PM
To: Blodgett, Wayne CIV CNIC
Subject: RE: 0817 Needs Input

Some thoughts.
For any ship that is boomed it would we worth looking at some oil or petroleum sensor that could be placed within the boom that would alarm to port ops when oil gets into the water. After dark is when we have problems seeing if a spill has occurred while bilge or fuel is being shifted within the ship and if the valving is in error we may not know for 30 minutes or an hour.
Sensor is calibrated for DFM and JP5 and I do not know what to do about bilge.

Look at the security booming that have be placed at ports and see if can also provide spill containment within the design or modified to include spill containment.

Research if there are methods or ways to reduce or slow the currents in the River where fuel barges are unloading to a tank farm in a river (like the St. Johns River Florida) Without have to construct permanent solution since River channel can not have obstructions.

Are there booms or portal devices to protect marshes and wetlands from oil getting into the wetlands and along shore lines and beaches that can be pre-stages or deployed quickly.

-----Original Message-----
From: Blodgett, Wayne CIV CNIC
Sent: Friday, March 17, 2006 13:38
To: Pitchford, Clark A. CIV COMNAVREGNW N45RO; CourtneyT@cfac.cnfk.navy.mil; Pang, Cynthia Y CIV NAVREGHAWAII, N45; Byerly, Didi R CIV NRS Environmental; Broadus, Dominic CIV CMDR Navy Region SE; dominic.broadus@cnre.navy.mil; Montoro, Don N CIV; Devereaux, Kelly W. CIV CNI; mark.cruz@guam.navy.mil; Costello, Martin CIV CNRMA Env; Tucker, Michael S CIV (EFANW); Davenport, Mike CIV CMDR Navy Region SE; Conant, Richard CIV Environmental; ross.lonnie@cnfj.navy.mil; Brown, Tammy CIV COMNAVREGNW N45RO2
Subject: FW: 0817 Needs Input

NOSC Reps,

I was contacted yesterday by Chuck Katz at SPAWAR in San Diego. Apparently this is the time of the year when the Navy's Research and Development organizations (including SPAWAR) identify needs for future R&D. Chuck asked me if we had any needs in the spill response area. So I am asking you. If you have any ideas, please let me know by 23 March. They don't need to be especially well developed, just general ideas that require further refinement are OK. Identifying a potential need does not mean that it will be funded, it goes on a list to be considered against other R&D needs.

There have been a few R&D efforts in the spills area in the past. SPAWAR has studied oil spill sensors for use in Navy harbors. NAVFAC has examined antifouling options for boom and skimming technologies. Chuck also lists some possibilities below.

Feel free to respond to the whole group if you think an idea needs input from the other NOSCs. I don't need negative replies.

thanks

Wayne A. Blodgett, P.E.
CNI Environmental Program Office
2713 Mitscher Rd SW STE 300
Anacostia Annex, DC 20373-5802
(202) 433-4513 DSN 288-4513 FAX (202) 433-0841
wayne.blodgett@navy.mil

p.s. RADM Hering's message below is also interesting

-----Original Message-----
From: Katz, Chuck SPAWAR
Sent: Thursday, 16 March, 2006 14:58
To: Blodgett, Wayne CIV CNIC
Cc: Andrews, John SPAWAR; Montoro, Don N CIV
Subject: 0817 Needs Input

Wayne-

Thanks for your time today to discuss potential R&D needs in the oil spill response area. The "Needs" input process is still open and through all of next week and possibly through the 29th. See RADM Hering's recent email on the topic of oil spills below. The website for putting in needs is:

Original: www.jcte.jcs.mil/needs/envform.html

Alternate: http://cws.nfesc.navy.mil/index1.html

Some of the ideas we've discussed around here as well as with Don are:

1) Developing tools to link oil spill response efforts with harbor security monitoring...the idea here is that there are command centers popping up all over that are controlling/watching harbor vessel traffic and operations so why not tie in tracking devices for spill response boats to these centers so they can be controlled and monitored at the command center.

2) Better modeling/nowcasting of spills. Having better harbor models that can take in real-time spill info, sea conditions/tides, wind/climate and possibly spreading information (see 3 below) to nowcast where and how fast the oil is moving.

3) Integrating oil sensors (already available) into response management tools...the idea here is that there are already sensors out there that can measure oil under conditions when its not visible by the naked eye (e.g., at night, light fuels in elevated sea state) so why not integrate this sensor into the response tool that gets put on a command boat that does a quick reconnaissance to find and map the oil front to identify where best to place booms, put data into nowcast models to update them, and send data back (RF Link) to the command center for control decisions.

4) Linking command centers for oil spill response. Command centers need to be stood up when a spill occurs so why not develop tools to bring in data from other centers already up for use for other purposes....like the harborside security command center data on vessel traffic, weather data, etc.

Let us know if you need anything further from me....cnk

From RADM Hering:

THE REGION'S OIL SPILL RECORD IN SAN DIEGO HARBOR IS GETTING WORSE, NOT BETTER. ALTHOUGH THE OVERALL TREND THE LAST SEVERAL YEARS HAS BEEN POSITIVE, RECENT SPILL ACTIVITY IS A SIGNIFICANT CONCERN. IN THE FIRST TEN MONTHS OF CY05 WE WERE ON TRACK TO HAVE ONE OF OUR BEST YEARS; HOWEVER, IN NOVEMBER, SPILLS WERE UP OVER 50 PERCENT OF OUR MONTHLY AVERAGE AND WE SPILLED MORE FUEL IN ONE MONTH THAN WE DID IN ALL OF CY05.

To counteract this recent trend, the Region Waterfront Environmental Coordinator is providing Environmental Awareness training on oil spills to all ships homeported in San Diego, to personnel who operate small boats, to personnel who have the potential to spill oil or fuel products into the bay, and to personnel who work along the waterfront and may discover oil spills. There will be a training session at SSC San Diego at the following time and place:

Chuck Katz, Oceanographer
Environmental Sciences and Applied Systems Branch
SPAWAR Systems Center (SSC) San Diego, Code 2375
53475 Strothe Road
San Diego, CA 92152-6310
Voice: 619-553-5332
Fax: 619-553-6305
Cell: 619-301-7643
Email: chuck.katz@navy.mil

~ ~ ~ ~ ~ ~ ~ ~ ~ ><((((º> <º))))>< ~ ~ ~ ~ ~ ~ never follow

From: Arias, Ernie SPAWAR
Sent: Monday, February 06, 2006 12:17 PM
To: Chadwick, Bart SPAWAR; Davidson, Bradley SPAWAR; Katz, Chuck SPAWAR; 'jgroves@csc.com'
Subject: FW: Oil Spill Environmental Awareness Training - 7 Mar 06

The following might concern our own boat ops.

-----Original Message-----
From: Kohlheim, Mark (XO, SSC SD) [mailto:mark.kohlheim@navy.mil]
Sent: Wednesday, February 01, 2006 12:35 AM
To: hmcors@spawar.navy.mil; piergroup@spawar.navy.mil
Cc: Unetic, Frank D (CO, SSC SD); Patton, Mark D O-6 Naval Base Point Loma, N00; Beaty, Jeffrey M CDR
Subject: Oil Spill Environmental Awareness Training - 7 Mar 06

Team,

RADM Hering, Commander, Navy Region Southwest, recently sent out a formal Navy message concerning oil spills in San Diego Bay. The following is an excerpt from that message:

THE REGION'S OIL SPILL RECORD IN SAN DIEGO HARBOR IS GETTING WORSE, NOT BETTER. ALTHOUGH THE OVERALL TREND THE LAST SEVERAL YEARS HAS BEEN POSITIVE, RECENT SPILL ACTIVITY IS A SIGNIFICANT CONCERN. IN THE FIRST TEN MONTHS OF CY05 WE WERE ON TRACK TO HAVE ONE OF OUR BEST YEARS; HOWEVER, IN NOVEMBER, SPILLS WERE UP OVER 50 PERCENT OF OUR MONTHLY AVERAGE AND WE SPILLED MORE FUEL IN ONE MONTH THAN WE DID IN ALL OF CY05.

To counteract this recent trend, the Region Waterfront Environmental Coordinator is providing Environmental Awareness training on oil spills to all ships homeported in San Diego, to personnel who operate small boats, to personnel who have the potential to spill oil or fuel products into the bay, and to personnel who work along the waterfront and may discover oil spills. There will be a training session at SSC San Diego at the following time and place:

Oil Spill Environmental Awareness Training

7 March 2006

0900-1000

Bldg. 128 Auditorium, Bayside

The training will cover reporting requirements, major regulatory requirements/Navy policy, oil spill notification/reporting, hazardous materials and hazardous wastes, best management practices and the Afloat Environmental Quick Response Guide. If you are someone who operates small boats, has the potential to cause an oil or fuel spill in the bay or work in an area where you may discover spills in the bay, I strongly encourage you to attend this training. Also, please disseminate this information to all who may benefit from this training.

If you have any questions, the SSC-SD POC is Jim Krake, Environmental Support Group, Code 20384, (619) 553-5027.

r/

XO

APPENDIX C:

Oil Spill Drill Notes

SPILL DRILL NOTES

HAWAII SPILL DRILL (6-7 MARCH 2007)

Oil Spill Drill NAVREGHI 6-7 March 2007

Visit to Hawaii Command Center

- Run by Co-op of oil Company, Marine Response Service Center (MRSC)
- Clear Island Council has pre-packaged laptops/sat. phones at center
- Laid out exceptionally well
- Costs-$45K/mo Ops. Center
- **Wireless workstations** throughout
- Navy could be a part of Ops Center for $10K/yr but contracts won't work (MOU requires Navy provide resources to group if needed)
- **Video teleconferencing capability cited as a need by Commander and Admiral**
- **Can't get to ICS forms on NMCI**
- CDs are avail in HI command center for ICS forms (also hardcopies)
- Re: previous idea of providing laptops to NOSCs for use (Mitch Perdue)– maintenance, new software, NMCI – may not be feasible
- Future Contacts - Chris Curatilo, USCG-HI, teaches ICS, Katrina exp
    - He thinks paper system is good
    - **Floats don't track oil well**
    - **Real-time eyes on scene would be beneficial to OSC**
    - **In-water sensor needed but they do have some sort of sample collection unit** – FOLLOW UP

Ideas on tracking/Sample Collection:

Floats don't track oil well (USCG)
How 'bout "Bots" that can match oil dispersion?
What about if they lit up when contacting oil?

3/7/07

Drill Observations

- Future Contacts at SPAWAR - Wesley Yamamoto (SPAWAR Hawaii),
- Tactical Communications Plan – Coast Guard - Scott Morse
- Map of base was used to identify primary areas for ingress/egress of response workers
- Some personnel used a posted newspaper to get tide info. and weather, others went on line- Info was not widely disseminated in the center and multiple groups had need for it(Ops,Env, Sit)
- **No real-time weather available**
- Booming strategies available on CD
- Personnel were going online to EPA's oil spill site to get info on chemical characterization, degradation- This effort was being done using searches vs. actually knowing where to go. **Info was chemical specific (benzene) rather than product (diesel, JP5) specific which is really needed**
- Sit Chief makes sure Sit Map matches Ops Map. Unified Command has access to OPs and SITMAPS via video, **why not have internal link to all of these using wireless Video links and displays?**
- Personnel were going to plume dispersion model for vapor info (ALOHA 5.4.1). **It would make sense to have the calculation spreadsheets readily available on CD**
- How well do booms work on Diesel? Robbie says they work well under harbor conditions
- Comments from OPs personnel-**radios, not telephones work best** to communicate with responders
- Logistics group was making up a **spreadsheet to track requisition and status**-suggested it would be nice to have this ready-made. USCG says this exists.
- Forms being used are "old" – need to keep them updated yearly
    - Forms are standardized for CG, but why not Navy
    - USCG has " IMATS" Spreadsheet tools –need to check with Robin Brown USCG
    - Tracks costs and time availability too
- Noted that some real-time info. Was not being updated between OPs and Sit group (e.g. wind conditions) **–link!**
- Noted current speeds identified were wrong – says 10-17 kts (these were wind not water!) **–link!**
- When groups were discussing action items, it would have been nice if someone could **graphically show what the assets were and where**
- Briefing to Unified Command suffered from having **only static maps** to show
- **CG states best way to view spill is form the air, boat views are not useful**
- Admiral Alexander asked what happens if there are multiple disasters (earthquake, fires, spill)? How does Navy integrate and liason with groups?
- **Capt. Skandon – suggests setting up Crisis Action Team at PH Regional Command Center** instead of at Clean Is. Council (Cynthia identified problems with non-military personnel gaining access.) NOTE: ROC is being built by SSC Charleston- POC John Whitehouse, bldg 150
- Public Affairs for NAVREGHI uses the Joint Information Center website to handle press releases

- USCG – National Strike Force – available at all times, fly away teams too
- **Key To Mitigating Costs and Impacts - Preparedness and training**
- **Skimmer operators cannot usually see what they are recovering**

Questions to think about:
What about the use of facility cameras for use by NOSC?
Why not contact media helos to get aerial views?
Camera System try to get eyes on the ground back the command center
What about sensors put outside of boom locations as sentinels?
How to measure oil vs. water in terms of recovery? (decant oil from water)
How to best do oil mass balance?
When does Spill of National Significance get tripped– varies on circumstances

Some Players at Drill:

NOSC – Capt. Skardon- Chief of Staff Reg. Hawaii
FOSC – Capt. Adkins -USCG
SOSC – Cutis Martin-State of Hawaii
Admiral Alexander popped in during drill
Contract Lawyer – Rebecca Hommon

Drill Debriefing

- Unified Command – 5
    1. Good Booming strategy Good – Add Emergency Decon Process
    2. Good UIC Staff
    3. Comms – UA side – need better, direct comms.
    4. Funding Process – needs further work
    5. Naming the incident early
    6. Missed – IAP Planning Meeting – try an exercise that gets to IAP
- Command Staff
    1. Problem – SIT Awareness – not clear how much oil went into water
    2. Worked well together
    3. CG great teachers
- OPS
    1. Neg – Comm. field to OPS difficult – not right enough info.,
    2. quick enough
    3. Manpower - runners I not enough
    4. Good scenario
    5. Ops/ facility – great, Great Learning, Joint Learning
- Planning
    1. Great Teamwork
    2. Lack of scribed recorders
    3. Digital cameras very useful tool – personal use
    4. CG coaching great help
- Finance

1. Requisitions were incomplete
2. No forms available
3. Negotiated Agreements not available
4. Name Tags
5. Co-op great
6. Finance and Logistics – combine?
7. Each Section Sign in/out

- Logistics
  1. Confusion – interact with resource unit
  2. OPS Confusion and how things get ordered
  3. Good Tracking System implemented quickly
  4. Realistic Vendor Response
  5. Unaware of Contingency Plan
  6. NavRegHI – personnel use not realistic

3/8/07

Evaluator Debrief w/ Cynthia; Scott Morse; Frank Marcinkowski PCCI – Supsalv

- Train on what impacts might be to ships
- Since 9/11 - NIMS Inc. Command Systems
- **Simplified forms needed**
- Env. Planning Dept. and Ops.
- **Hard time w/ lack of support from commands -**Equip., Buildings, Real Estate
- Logistics – how to get resources in for response
- Wash DC environmental $ siphoned away from Regions – no one to turn to
- $ for people for training
- **Split money – NAVFAC funds training, excercises – not enough**
- Centralize training for ICS
- NOSC flexibility
- **Pain getting people on base w/ interagency personnel**
- **What is oil thickness??? Critical – How much to recover???**
- **Software can't run on NMCI**
- **UAV – Spill visualization tool -Recent test on dispersion** ~$ 50 K to buy
- **Smart forms for real events**

SAN DIEGO NPREP EXERCISE (25-26 APRIL 2007)

25 April '07

NPREP Exercise

Area Contingency Plan – Revised in last couple of years
-Lt. Kelly – Planner in response Department (USGS)
-Capt. Strangfeld – USCG (Mexican Navy here)
Robin Lewis – CAF&G (was at last drill) Senior scientist
- OSPR- Oil Spill Pollution Response
- Monterey to Mexico
- Wireless Computer, Sprint Trios – Bluetooth Pen - GPS
- COMMS – Jay Haawk – located at CG Station – Fed co-localized w/ local assets
- Encrypted radios w/ CG – JTERS???
- RCS- Regional Comms. System
Helos – 800 mHz Systems
ICALL – U.S., Canada, Mexico
ITAC – International
Boats/Helos – VHF
Trailers/Tracks – Internet, phones, 800 mHz Handhelds, VHF
Patching – connect to other agencies
- OSRO – p.12 – Blackberry Focus
- Direct Video p.16
- Rick Wurtz - need to switch frequencies to cover all comms. with different agencies
- Two issues: Interoperability w/ 800 mHz, VHF vs. 800 mHz Radios
- SDR Alert → CG, lifeguards, sheriffs, habor Pd. – SD Oceanside – Aquatic Rescue Agencies
- Goals: (1) Zone within 800 mHz Command and Tactical for all lifeguard (2) VHF (offshore) – Way to create patch between 2 VHF freqs. & 800 mHz freqs.
- DFG – small dept.
- DON – VHF, cells – 1.8 mHz RCS – 7 Jun Equip. Deploy
- Command post @ NBSD
- Navy Comms. don't match up with other agencies?

Gateway Systems – allows intercoms. between radio systems

Three shared systems: Regional System; City of San Diego; Fel Fre Joint Task Force; Dept. of Justice – Border, FBI, etc.

- Next two years – use system id gage – internel – seamless
- 2015 – High Speed Data Info. – all together
- ICS 205 – COMMS Form
- Size Thresholds: 1000, 10,000, 100,000 gals.

- Demo Application: Sprint, Bluetooth

Live Video from Treo-Real-time feed from field- Video & Sound
Bluetooth Pens-GPS included
4 Simhaces feeds – via cell sites
Notes:
GPS - $100 websites
Recording Capability
Nighttime?
Updates between calls difficult when flying > 150 mph
$300-400 for phones – Treo – CG approved
Govr. Grey w/in Sprint to set-up - monthly charge; treo better

http://b2.commu.com/uscguardsandiegotrial/
includes Mosh Manual

GPS ↔ Treo (Video, Comms, Txt, Forms) ← ICS
Non-oil Haz Materials
FOSC → Haz Materials → authority from CERCLA/CWA
CG – offshore vessels
EPA – onshore

NPREP 2007 San Diego (Kurtz notes) April 26, 2007

I- Robin Lewis- Dept. of Fish & Game

ACP Updates will be out in June.
Went over the ACP history and revisions.

II- Walter Nordhausen- Dept. of Fish & Game

Spill Scenario:
At 3 hours, it hits Delta Beach.
At 5 hours, it hits Sweetwater Marsh.
At 12 hours, it hits carrier basin and NAB LCU's.
At 24 hours, it oils the whole Bay.

Fill out the form for the first 24 hours of the spill.

Shoreline is the key to this exercise! November is the time frame! South Bay National Wildlife Refuge and Delta Beach are concerns!!!

Needed:
1) 600 ft boom for Delta Beach (Navy help)
2) Within 6 hours, the half bay protection plan could work.
3) Berm by Paradise Marsh.

III- Melissan Boggs-Blalack- Dept. of Fish & Game

Wildlife Plan- Oiled wildlife care network has 25 organizations across CA.

Activation of a rescue effort occurs when there is no known spill reported and

1) >2 live oiled critters have been found.
2) >5 dead oiled critters.

The only areas I can see for improvement is how they do their aerial surveys. They have to do aerial surveys in order to find where the animals are or have gone to in some instances, before they send people on the ground to try and rescue them. I do not know if there is a better way to do that or what technologies are out there to id animals via infrared maybe??

The ACP will be available on the web through the Coast Guard's Homeport website (http://www.homeport.uscg.mil) . There will not be interactive maps, as GIS is not a component of their website.

Communications are through the Coast Guard, Harbor Police and the Regional Communications Systems-, which is an emergency management system for all problems at sea. Main communications types are radio, cell phones, PDAs and VHF.

In the scenario, we did not get into that much details as to whom communicates with whom and how. All we did was figure out, given the amount of resources available for the spill scenario and the time the oil would be hitting key spots, which areas to protect first and how we would do that. Contractors are generally called out in these situations and they respond to the regional action team and Coast Guard for orders.

There is a very detailed way that the wildlife response is called into action. It is located in the Regional Response Plan Appendix XXIIa and XXIIb. There are specific numbers to call to activate mobile shelters etc., with the closest one in San Diego being at Sea World. Like I said earlier, not just anyone can call these numbers- there is a specific chain of command to be followed as outlines in Regional Response Plan.

SAN DIEGO (7 JUNE 2007)

Oil Spill Drill Observation

Observer: Ms. Shayne Camantigue

San Diego Port Ops Naval Station 32nd Street
Building 150
Thursday June 7, 2007

Initial Observation:

Each Unit/department had a separate role leader and was organized with regards to their departmental duties.

Departments:

1. Planning
2. Logistics/Finance
3. Unified Command
4. Operations
5. Resource Unit
6. Safety Office

Situation unit: Chart/list displays the planning and stages of oil spill disaster and actions taken within each time period.

Don Montoro – Navy Incident Commander (NIC)

Kelly Dietrick, USCG Resources – Technology "Resource Unit Leader"

- Popeye- Chuck is interested in knowing about this. New technology (in R&D). It has gone through a test-run and passed.

Kelly discusses Popeye:

1. Drops from helicopter
2. Collects surface water. Samples water in oil.
3. Collects oil/retrieves by boat since device floats
4. Analyzes/ID thickness of oil

Contact USCG Lt. Al "Jeremy" Tendorf (FOSC) regarding Popeye.

Tom Marquette, PSS:

PISCES- "ICS Forms Navigator- Hierarchy and Schedule"

- Chuck mentions digital forms- better for record keeping
- What if power goes out? Should have a hard copy.
- ICS forms- A good system- files away as a hard copy
- Nautical charts, maps available
- How well trajectory works? Tom's Opinion: Mapping is the same for each system. Forecasting tool is useless. Weather patterns change and varies.
- Pisces chart: (Technical data) vectors are in place - displays the location of the oil spill (in this case between pier 4 and 5), shows the source, simulation, and forecasting tool
- Chuck mentions how hydrodynamic models compare???
- Simulation of boom using PISCES (Waiting on call first before deploying boom using PISCES)

Once call is received (through PISCES):

- Places a protected water boom
- Vectors show wind direction
- Vacuum skimmer was used (has many types- mechanical, weir, vacuum, etc.); many options available
- Tracks route/speed- great tracking system

Further info. can be found at: http://www.transas.com/products/simulators/pisces/

CDR Jeff Beatty, Point Loma XO – Conducts ICS-201 Brief Reporting 920 am:

- USS Ogden- Pier 4; 50,000 gallon DFM (Diesel Fuel Marine) spill (shown on SITMAP)
- Gives wind directions and direction of oil
- Reports the locations of where boomers are set-up on SIT MAPS; coordinates are given
- Announces the time schedule of operations in consecutive order starting from the initial oil spill incident (everything is documented manually)
- We have response collaborations with Naval Base Coronado (deployed boomers and skimmers), Coast Guard (sent helicopter), and Naval Base Point Loma
- Mentions Shoreline Cleanup Assessment Technology (SCAT), Fish and Wildlife concerns and Protection Plan. (further discussed in the ICS 204)

-Chuck Katz attends UC meeting. Chuck observes Operations Unit. The section heads meet up and discuss future plans. All PA's meet up and set up a Joint Information Center.

PLANNING MEETING (PRE-PLAN before TACTICS MEETING) 1000 am:

Planning Section Leader- Brian Gordon
USCG (Resources Leader)- Kelly Dietrich
Environmental Leader- Chuck Katz

- Worse case scenario should be planned. (show trajectories and sensitive areas)
- ICS 202-CG Worksheet (Incident Objectives) passed out: Discusses objectives and operational period command emphasis.
- Equipment- When will it be released?? Document present and future equipment release
- Work with PISCES2 with Tom Marquette
- Update on who is out there handling the spill??
- Discuss next meeting (TACTICS MEETING) – In order for the ICS to be completed, the PLANNING department should get in touch with OPERATIONS. During the TACTICS MEETING, the ICS 215 will be finalized.

"ICS 215" – 1030 am:

- Kelly Dietrich documents tactics and resources on ICS 215 chart: "Operational Planning Worksheet"
- SCAT/OPS Assessment- Resources will be needed. A list of work assignments are given.
- Need trajectories→ Spill modeling

Situation problem occurs: A report of a broken boom was just announced. Now the sensitive areas are at risk. There are many assumptions, but the goal is to put "DATA ON PAPER." A 24-hour period chart (Operational Planning Worksheet) documents present and future resources.

Example:

-Future/ June 8 chart consists of:

-predicted resources/boom equipment, personnel, anchors, skimmers, etc.

-Further discussion was made that Don Montoro is more concerned with present resources (June 7) and not so much as future resources (June 8) as of YET.
-Discussed the sensitive areas on maps- contact SDG&E to shut down and close gates near salt marshes where oil will be headed; Fish and Wildlife (F&W) notified; environmental leader takes control
-Once current resource data on chart is complete, future data is documented.

Tug Boat Field Trip:

Conductor- Senior Chief (SC) Lynch
Attendees: F&W Judy Gibson and another lady, NF-SW Contractor Amy, Ron Gauthier and I

- Observed V-shaped skimmer, U-shaped skimmer, boomers, vacuum trucks (holds 3K gals.)
- Double booms were set up around the ports affected for extra security and to avoid spreading to sensitive areas.
- SC Lynch discussed how resources are set up and the availability of resources on base if and when an oil spill disaster occurs.
- He showed us the facilities/command units where oil recovery/storage is recycled.
- I asked about the history of oil spill disasters on the naval base. He mentioned how there were mainly minor spills and recovery and clean-up were fast and successful.

NOAA Jordan Stout – demonstrated electronic-based notes.

1. GNOME (General NOAA Oil Modeling Equipment)- Featured Software and Data Sets available online

- trajectory model
- forecast trajectories; more accurate than HF Radar, which is only 24 hours.
- tests winds/currents
- re-run GNOME model with up to date baseline

2. ADIOS2 (Automated Data Inquiry for Oil Spills)- Featured Software and Data Sets available online

- chemical feed model
- oil library- displays many types of oil
- displays oil product properties

3. SHIO – estimated the heights/activity of tides geographically and currents for U.S. ports.

   See links for more info:
   http://www.osti.gov/energycitations/product.biblio.jsp?osti_id=220254

   http://response.restoration.noaa.gov/book_shelf/958_products.pdf

4. ALOHA (Areal Locations of Hazardous Atmospheres) air model

   See link for more info: http://archive.orr.noaa.gov/cameo/aloha.html

5. MARPLOT (Mapping Application for Response, Planning, and Local Operational Tasks)

   See link for more info: http://archive.orr.noaa.gov/cameo/marplot.html

Website: www.response.restoration.noaa.gov

Other information:

Pier 4/ Initial Incident Objectives:

1. Ensure personnel safety
2. Coordinate with local responders
3. Contain and Recovery Spill and minimize spread
4. Maximize Protection of Environmental Sensitive Area
5. Rego. Public Informed

SOSC- Chris Graff
RPIC- Don Montoro

Comments:

A good experience to say the least. I was glad to have the opportunity to see the oil spill drill live and in action. It actually felt like a real-life oil spill disaster had occurred. The way the Navy handled the situation was quite impressive and the quick response and communication between the departments/agencies was fairly organized. I feel that we(SPAWAR observers) were able to gather useful information as far as technology is concerned and other informative data (new and old). Hopefully, future oil spill drills will continue to improve and the Navy will be even more prepared to respond to real-life oil spill disasters.

OIL SPILL DRILL SAN DIEGO

Observer: Ron Gauthier

OSPR IAP software
PSS (Tom Marquette) contracts under NAVOSH + NAVFAC for oil spill response & training
IT P2P networking w/ Pelican cases

ICS so flexible, difficult to maintain electronic formats
ICS forms NOAA 1.0 (June 1, 2000)
Feeds into IAP

Short-term forecast OK, no resolution for harbors & coastline

6-10 types skimmers

mechanical, weir, vacuum, oleophilic, (SW)

CDR Jeff Beaty, PtLoma XO, did Situation Brief 201 @ 0920

50k gals Ogden @ pier 4,
Booms, skimmer, overflight

Chuck attended UC meeting: tasked 24 hr work,

Nat Resource Trustee & Technical expertise (Jordan's Planning here, but under OPA90, he's S&T support to USCG)

PLANNING MEETING @ 1000
Chuck's taking over as Environmental Leader for CFG, who responded to real spill
- protection of environmentally sensitive areas IAW ACP

Unless continuously updated, modeling trajectories invalidated as operations progress (recovered oil, boom changes, wx + current changes)
- Ops will do Wildlife Management Plan
- Tactics mtg to develop ICS-215
(Little red handbook)

Kelly Dietrich, USCG (Resources)
T-cards posted on wall (tracks resources + locations)

SCAT (will do on 204), normally done by Environmental Unit Leader

NOAA Jordan Stout: modeling trajectories (PSS is in supportive role to NOAA, in case latter runs model, so as not to conflict)

Martin mentioned that MSEL had boom fail + now operating @ 10%

215-prep Ops brief/meeting @ 1030

Op Planning Worksheet
3 TFs (3 Naval bases) for on-water:
1) SD - now Harbor Buster P7-4, need & have 2 util boats, 1 skimmer, 10 personnel. Also skim twn P5-6: 1 skimmer, 2 UB, 9 p, V-legs, P9 1000ft boom + anchors, boats +5p, vacuum truck
2) PL -5-4, ditto requirements, 600 ft boom to do V-legs; deflection boom outside barriers P6, boats+5p, 1000 ft boom
3) deflection boom, boats+5p, 1000ft boom; skim P2, 600ft,

Also: Contractor team to clean up + assess NAASCO with boat, absorbent pods, vacuum truck

SCAT: have 1 team, etc

Trajectories: Tito mentioned boom break invalidated prediction (brought 8x10 printout, would be nice to have elex visualization in Planning room in addition to output over in Situ space) BUT Beatty wanted to focus on paper drill (they know how to flex to events)...Don Montoro walked in + checked Beatty to re-focus on today + plan to protect environment.
- Sensitive areas described in a book (ACP= Area Contingency Plan)

Tug
SC Lynch, F+W Judy Gibson, NF-SW Contracting Amy LN?,

Doc team captures grease poster so they can erase & do Tactics (?)
After

USCG Lt Al "Jeremy" Tendorf (FOSC), Popeye

Jack Prescott, CF+G, Incident Action Program (vendor?)

PLANNING MEETING
Ops, Plan, Sit, Safety, Log, Finances, (PAO not present), Liaison, UC (Don Montoro)
Brian Gordon, Planning Chief, led off
Tito, Sit: present oil spill status, future Wx (NOAA provided T+C predictions),
Sheen broke thru boom & went south.
Beatty, Ops: briefed deflection & collection booms & TFs, SCAT (no cleanup teams deployed), Safety

Don interested in evaporation, Jordan gave wind-dependent (70% left in 24 hrs if 5kt wind remains, BUT excludes amount recovered)

Kelly, Resources, briefed T-cards

FNLN, Logistics, requisition forms

Next 24 hrs
Ops, wildlife search & collection, skim & boom, SCAT, decon & Haz assess, no night ops or hazing (?)
CFG, Interagency: air hazards, notifications

Don down on elex forms, Kelly talked @ Exedata.

Jordan
Oilmap OK
HF, CODAR 24h montoring (only surface, can't parse)
Rerun model w/ overflight updates
ADIOS2 - evap + disperse fractions

For many different oils

Shio for tides + currents (at reporting stations), Wx forecast
Chart Navigator (freeware Viewer)
Aloha air model
MARPLOT mapping
Cameo suite, chemical database (has Aloha + MARplot)

Ask Thomas @ photo/GIS work

Puerto Rico spill (off Farallons? huh?), NOAA got burned with not having nighttime tracking data to updates the model predictions

GenWest GIS tools
Don is happy w/ NOAA + other agencies' tools

SPILL OF NATIONAL SIGNIFICANCE, GREAT LAKES (19-21 JUNE 2007)

From: Katz, Chuck SPAWAR [mailto:chuck.katz@navy.mil]
Sent: Monday, July 02, 2007 1:43 PM
To: Gauthier, Ron SPAWAR
Subject: RE: ROUGH NOTES FROM SONS GREAT LAKES

Ron-

A few things to add to your notes etc.

Add to Notes:

1) Use of MS Sharepoint as a communications tool within the ICS for file sharing, sit map sharing etc.

2) Need to follow up with Bart on SUPSALVs needs to measure flow rates into recovery bladders; and sensing water vs. oil through hulls when salvaging ships (could apply to USS Arizona)

3) One idea SUPSALV and Lehmann had was an airborn (vapor) detector for early warning vs. in-water detector. Can be used for both land and water spills.

4) I'll photocopy my notes on the "Top 3, Bottom 3" to see if we need to fill this in.

Also:

What do you think about sending Steve Lehmann (steve.lehman@noaa.gov) a copy of the matrix and get his view on it (a good reason to contact him and follow up)? Anyone else you can think of?

We should follow up verbally with Mark Schultze at NRMW because I never did get his email correctly (I did ask Kelly to forward). We can start with Kelly Devereaux ((847) 688-2600x362).

Chuck

-----Original Message-----
From: Ron Gauthier [mailto:gauth@spawar.navy.mil]
Sent: Monday, July 02, 2007 11:41 AM
To: Katz, Chuck SPAWAR
Cc: Gauthier, Ron SPAWAR
Subject: ROUGH NOTES FROM SONS GREAT LAKES

Chuck - there are a few tidbits in my notes that we can use, I'll capture in the doc I am building…

SONS - Great Lakes
RADM LastName? (CNRMW)
RADM Crowley (USCG) will drop by
Bob Allen - USCG coordinator
Largest excercise in U.S.
CAPT Bruce Jones, USCG

- challenge is always Coord, interoperability, funding, crossing jurisdictions
Fred Micke, US EPA Incident Commander

Scenario Recap by CAPT W Miller
Drawing on 2x3 map for audience of 200 (was tough enough for me in 6th row, people could not see 20 rows behind me)
DFM-2 into Lake Michigan

Long delays setting up Situation Brief on laptop overhead while hundreds of people wait (lots wasted time, 30 min).

Unified Command Meeting
Situational Brief - Jeff Heib
Unified Command - CAPT Bruce Jones
Safety Officer
Traffic Safety Plan
Press Release
Ops - safety zones, staging areas

1200 Tactics meeting

Kelly Devereaux, CNI
John Blayne Kirsch, NAVFAC Business IPT IRN (Installation Restoration, Navy)
(they will merge)

EPA Trailer w/ com antenna
Lisa, START (Superfund Tech Assessment + Response Team) Contractor, Emerg Response Team
Bob, Fields unit, using ArcView to display trajectories, problem getting both layers (station locations + data)

Scott Tremblay, CNIC
Lindsay Nehm, CNO Water
1200 Tactics Meeting (missed 15 minutes?)
Simplex point-to-point radios, City of Chicago, very few, Section Chiefs must approve, capture in ICS-204/5.

Bill Walker, Kemp Scudin,
SUPESALV
Thur AM demo
Tow boats, skimmers (1600 gal settling sump) + 26k gal bladders, C2 van and contractor personnel trucked out (1 day crew), but need local heavy lift help

They recommend chatting with
Steve Lehman, NOAA SSC (tech, imaging)

1500 Situational Meeting
Need WQ intake report for press inputs
IAP being prepared for briefing at 0800 tomorrow.

Mark Schultz, Planning Section Chief (Kelly + Bruce works for him), Env Director Region

Lindsay put together spreadsheet on oil tank farms + leak detection installed
(DESC Defense Energy Support Center, under DLA)

3 Tiers for Recovery (5090):
1) Facility ops
2) Region support
3) SUPESALV call away ($8M, compared to $5M NFESC, cleaned up 50% of Valdez spill, but only 10% was cleaned up)..

Notes from Lehman:
SLAR, FLIR- ok, not operational
LURSOT
Sonic,
No money for oil spill
Eyeball is best
Black is recoverable, color is sheen & is not

familiar with Popeye sampler, but oil spills are patchy, eye ball is best

Par Darling is a Norwegian consultant, uses satellite for early warning

Many spills start on land, maybe vapor sensor (VOCs) over land or in storm drain system, with automatic closure system (most Navy oil is light end with high VOC concentrations)

Notes from SupeSalv Demo (Bill Walker/Kemp Scudin)

they are 3rd tier (2nd is Contractor/Regional support)

Need for measuring volume or flow into the bladder.

Booms: (1) US42 (42 inches circumference) is 55 ft long; (2) 26 inch boom

Nofi Current Buster 600 operates @ 3-4 kts (most only go @ 1 kt), 000s gals
Lamor weir skimmer
Lamor brush skimmer
Douglas vacuum skimmer (peristaltic pump) - works reasonably for DFM

Different belts for different oils, rollers squeeze oil off belt to deposit into 1600 gal sump; heavier oil gets scraped by bar (doesn't squeeze out); decant bottom water with USCG permission (to concentrate oil), then pump into 26,000 gal bladder

2 towboats towing about 220 ft of boom in V-shape, supposedly operates in choppy seas

ISO 20 Command vans

Hotwash (Ron attended the Comms section)

Keith Laplant, 7th USCG district (disaster team):
MWR wireless had problems
no hard connections due to NMCI
Plasma too expensive
Even Katrina had only few screens - mostly Plasma, agencies do not have budgets for temporary efforts (+ exercise budgets too small)

Cellular portables make sense
Ruggedized PC Tablets
800, 700 MHZ workhorse
Interconnect Boxes (Raytheon ACU 1000 for $30-40k, $12k
mobile) to convert tween radio types

Tim Smith, DoE Argonne had the mobile converter ACUT
(specific cables for specific radios)

Main Outbrief (Ron's notes)
1) Ops (Chuck)
- internal comms + tween section comms
2) Planning
- no geo displays (Lindsay)
- Sit Board weak (Schultze this comment + below)
- initial USN 201 weak
- overall planning + tasking weaknesses
3) Log
- website didn't work well, but has potential
- no dedicated fax
4) Finance/Legal
- no dedicated copier, fax, etc.
5) Comms
- internet connectivity fixed by USCG, but NMCI a failure
- civilian EOCs played
- portable satellite system used for VOIP + hi-speed data
- difficult comms for some air assets
- Chicago brought in radios never used/requested
6) USMC
- his equipment gone to another exercise, Wisconsin Civil Air Patrol brought some
- needs to bring 2-way gear for USMC-USN comms
7) Safety
- better comms w/ medical

- better integration (USN, USCG, OSHA)
8) JIC
- representation (no USN)
9) Public Water
- ?
10) Incident Command
- Navy trains to, but doesn't use ICS
- internal EPA, USN, CG comms got in the way
- no elex xfer, esp w/in 1st 48 hrs (and IC shouldn't expect it)
- poor ops/planning interaction + updates

CHUCK'S NOTES (added from his handwritten pages)
1) OPS
+ Agency participation
+ learning critical infrastructure
+ ACP helpful to make decisions
- lack of guidance on exercise play
- disparity twn what was briefed vs the IAP actually said
- internal comms within Ops and twn sections
2) PLANNING
+ completion of 21 IAPs on time
+ good cooperation twn ops & planning
+ good cooperation twn DW and WQ groups
- situation board weak
- assessment/SCAT teams should stay within Environmental Unit vs Ops
- better comms twn Resources & Ops (needed one list of resources)
Lessons: no 201 done
- better awareness of resources
- better use of plans (e.g., ACP)
- better task direction
3) LOGISTICS
+ right people staffed for execution
+ website great for sharing – GREAT POTENTIAL, but not used!
+ very valuable training experience
- no ICP/IAP provided
- equipment infrastructure – no training, no admin support
- 213 prep even better if 213 preparation is briefed
4) FINANCE/LEGAL
+ Excellent training – everyone came who needed to be here
+ good comms – logistics and finance
+ great facilities
- funding source an issue - $ needs to be identified
- resource requests poor/missing info early on – threshold needed for approval too low
- lack of equipment – faxes, copiers, admin, etc.
5) COMMS
- frustration with internet connectivity (CG brought up capability Day2)

- NMCI access – can't work for response
+ satellite comms tested VOIP & internet
+ participation by City of Chicago – Trailer brought to get comms to beach 75 radios
+ EDCs comms between counties
- inability for CG to connect with air assets (see Ron's comment – I think with USMC specifically)

6) USMC
+ Apply their jobs into the scenario
+ air ops – mobile unit of CAP
+ interplay great
- technical comms twn ships/planes
- need people in all sections

7) SAFETY
+ Good agency support (OSHA)
+ played injects well & get closure & utilization from defense agencies
+ dedicated staffing lines
- medical and safety – poor comms
- could not tell real vs play
- need better initial integration of players

8) JIC/PAO
+ realistic tempo & injects
+ good work ethics, 100% effort
+ logistics – asked for and got it
- training – late or none, lack of shared knowledge (I think that was what was meant)
- not good representation – no Navy
- Drill description – expectation of equipment capabilities (phones, etc.)
- real JIC – no real images released
- need better prep of Unified Command

9) PUBLIC WATER SYSTEMS
- more rapid dissemination of real info – more technical info needed
- specific info needed – sampling
+ get water systems thinking about their ACP

10) UNIFIED COMMAND
+ Agency interaction, networking, facilities
+ right kind of people – NOAA, SUPESALV
+ ICS training
+ Face to Face comms
+ Able to identify gaps in plans & strategies
- internal comms crossing up with interagency comms - difficult
- electronic transfer info not able to feed up the chain - poor explanations
- breakdown of exercise expectations with whole area command; connect with teleconference with national venues
- media unrealistic – not enough play
- interaction with planning/ops/situation – did not have good enough

CAPT Postera (CO) and CAPT Jones (USCG): needed eyes on situation before briefings

APPENDIX D:

OTHER NOTES: PHONE CALLS, MEETING, CONFERENCES

APPENDIX D:
OTHER NOTES: PHONE CALLS, MEETING, CONFERENCES

Cynthia Pang Phoncon 7/8 Feb 07

- Invited to attend "Worst Case Spill Drill" on 7 March 07
- Oil Refineries fund local Command Center for islands
- Drill Scenario– Release of 150K barrels of oil from tank farm into PH
- State F&WS not too involved – low impacts to wildlife
- NOAA – involved w/ trajectory modeling
- Honolulu and District 14, State – Some, but not extensive involvement (?)
- Each NOSC Region different- HI has cultural-unique efforts on spills - all parties work together
- No NOSC $ to travel between regions
- Region $ through CNIC not NAVFAC- Requests go into EPR Web
- Cynthia would like stronger crossover between Regions on Technology, Communication
- First two days before drill – ICS training
- Pacific Strike Team acts as coaches for drills
- Asked to check into booming of boats during refuel ops in Port Allen

Cynthia Pang Phoncon 28 Feb 07

- Need good model for trajectory modeling – in particular: USS Arizona Release
- Model info now available: Evans (1974); recent current data few locations; CH3D – TMDL & Sed transport (not yet calibrated)

24 April 07
Phoncons with NOSCs

Kelly Devereaux – NRMW – 847-688-2600 x 362
Marty Costello – Midlant – 757-445-6685
757-268-6413 (cell)
Marty:
Modeling software that Naval Srfc.Warfare Center developed ~ 10 years ago for/to Coast Guard

PISCES –excellent for training, uses at Midlant but $25K for license

- Built on top of NOAA charts – images w/ GIS
- GNOME test Oct.
- Model within 500 yards
- Precision planning increase – Tom Makel – retired CG
- NE Region now part of his area
- Get NOAA weather, Spill figs.

- **Needs:**
  - **ICS forms w/ data entry slots;**
  - **Fill forms from remote locations**
  - **Spills at night? Spill Robot?**
  - **Consider: Oil Boom Capability to permanent Security Barriers**

Phoncon with Wayne Blodgett 4 December 2006

Main Topic - Scoping of Oil Spill IDR Project with Wayne Blodgett

Contact Info:
Wayne A. Blodgett
Environmental Engineer
Commander Naval Installations Command
2713 Mitscher Rd SW, DC 20373-5802
wayne.blodgett@navy.mil
202-433-4513 DSN 288- FAX x0841

Key Comments

1) The NOSCS will remain under CNIC on a regional level.
2) The regions are allowed to run their own programs and determine their own needs
3) Equipment needs are generated by individual Naval On Scene Coordinators (NOSC) rather than generated at the top and set as policy or directive (there can be some flexibility on this if thought to be necessary)
4) Wayne highly recommends working with NOSCs from each region and will supply us contact information
5) Wayne will send out a notification to each NOSC identifying the scope of our IDR and seeking their support of the work (our action is to get him a SOW)
6) Readiness is the key component to meeting regulations and response
7) SUPSALV is an independent entity working on their own and can be contracted when NOSCs need their services. They are the only group capable of operating in the open ocean. Wayne felt that they would not be a useful entity to contact.
8) There will be a Large Spill Drill (Spill of National Significance) at Great Lakes Region (CNRMW) in June 2007. He suggests attending.

9) NFESC is involved in testing new equipment on the market that may get implemented but is not actively doing R&D. Contact is Kurt Buhler, Randell Richter.
10) Oil spill equipment funding comes from NAVFAC. Money for equipment must be requested by the individual regions. This funding path may make it more difficult to implement items navy-wide.
11) Suggested to work specifically with Tammy Brown from CNRNW as she seems amenable to R&D and testing new ideas. She seemed particularly interested in how to track oil at night and predict where it's going.
12) The key thing that each region must meet is Readiness
13) Outside entities like NOAA and FWS can and do come in when needed and they bring their technologies. Having an in-house capability might be advantageous.

Notes From Y0817 Meeting, at NFESC, 16 May 2007

From: Ron Gauthier [gauth@spawar.navy.mil]
Sent: Thursday, May 17, 2007 10:27 AM
To: 'Katz, Chuck SPAWAR'
Cc: 'Gauthier, Ron SPAWAR'
Subject: NOTES FROM Y0817 MEETING

Comments during Chuck's talk, in chronological order:
1) Mauro: NFESC has also worked in this area (capture the lessons?)
2) Del Collo: is skeptical about this effort, since he managed Navy's oil spill response program for 6 mos at OPNAV
- knows about LSS efforts (we should coordinate with)
- thinks Navy is very good at responding to oil spills, one tech improvement they did was to improve skimmer performance on the light oils;
- he then asked Chuck to list some of the candidate technologies…
3) Chuck listed following at the top of his list:
- tracking oil spills (day vs night, radars and buoys, etc.)
- comms (streaming video)
- eyes on scene, including UAV, cell phone camera
- estimate of film thickness
(I had jotted down C2 wireless, modeling for both prediction & nowcasting, smart clipboards…these might also be good talking point items)
4) Del Collo: the only tech Chuck listed that resonated with Andy was film thickness; not sure about value of improving ICS under the Environmental umbrella…why not pass that one over to the AT-FP security programs in Navy?
5) Chuck: responded that the security guys are somewhat resistant to including the environmental aspects (he's got some experience trying to do this)
- for example, Cynthia Payne, when asked about the possibility of using the ROC (Regional Operations Center), replied that this would be problematic re:getting all the non-military folks on base in an expeditious manner
6) Del Collo: recommended that for FY08 Go/NoGo success, Chuck might want to pick 1-2 top items from a candidate technology list of 10 or more, and then consider working/socializing the remainder during FY08 for addition in the FY09 program.
- there are few procurement dollars available, primarily for boats/skimmers (recovery of oil), etc.
- favors a focus for their project on better strategies, processes, simple tools

7) Bill Hertel: 2 important aspects to oil spill response are
- keep spill to a minimum once it occurs (my interpretation: early detection & alerting)
- prevent spill from happening in the first place
8) Del Collo: to address Bill's 2nd item, he added that we might consider Root Cause Analysis (I added to our interview Qs) for Shoreside Spills (may want to check out the Navy's recent effort to do this for the At-Sea spills)
- NOTE, Lou Maiuri is Authorized Stakeholder above Wayne Blodgett at OPNAV, since oil spill program is such a high priority for Navy - gets personal CNO attention. Lou is also heading up Lean Six Sigma efforts
9) Bill: familiar with a Navy Oil Spill Database (may have a POC? If not, has one for at-sea effort at SUPESALV - Bill Walker)

Notes from 19 April 07 NOAA workshop on monitoring and assessment of oil spills

NOAA oil spill project review
From: Richter, Ken SPAWAR [ken.richter@navy.mil]
Sent: Friday, April 20, 2007 2:00 PM
To: 2375all@spawar.navy.mil
Subject: NOAA oil spill project review

Hi all - I went to a rather lackluster public review of projects NOAA is funding which evaluate monitoring and risk assessment of oil spills. This funding ~ $1.2M is administered jointly by NOAA and University of New Hampshire in a program called the Coastal Response Research Center. Since it funded EPA, business and academics, I would guess we could partner and go after funds as well. The main thrust is oil spill preparation via models, response, and post-spill assessment. A science advisory panel (5 members) as well as NOAA contacts, guide the PI's work. Most questions were left to the SAP members, while there were perhaps 50, mostly NOAA people in the audience. I thought I'd share my notes of the one day meeting reporting interim progress, held at NOAA's facility in Seattle on 4/19/07. Below are notes from the more interesting talks, sometimes combined with the 4 posters that were also presented. I'll skip reviewing several talks on the mechanics of coming to a public consensus on evaluating an oil spill's economic impact or the public's perception of the correct approach in dealing with an oil spill. Polls showed that public consensus was hard to reach, other than one paper I mention below.

High frequency radar observations of surface currents for oil spill tracking: This was the first and probably best paper. Work off of Pt Loma with dye, aerial mapping, GPS drogues and CODAR (the radar) were combined to compare the drogues vs CODAR for indicating where the dye would go. Drogues won. However the surface layer, which CODAR looks at, moved south while the mixed layer, where the dye was, moved east. CODAR should be more useful for surface oil that does respond to wind. CODAR can detect movement down to around 10 cm/sec. The Coastal Conservancy and other organizations is putting in a CODAR fence from Alaska to Mexico that will eventually be able to send data in real time to hydrodynamic models as well as oil spill response teams. Real -time data is available now off San Francisco and San Diego. I have names and telephone numbers.

Dispersants were examined for their effect on oil droplet size when coupled with different wave energy. This was a wave tank experiment.

Breaking waves break up oil into small ~ 10 um droplets and dispersants help in the process.

Oil droplets tend to get covered by suspended sediment particles when they are present (e.g. near shore area where a ship has gone aground in big waves) and this helps pull the oil droplets to the bottom. Dispersants tend to aid in this process, but it's not clear why. The biggest effect in enhancing particle coating is when the particles are relatively large (> 5 um) and low in organic carbon. This was another interesting talk. It is not clear what effect the dispersants have on the resuspended sediments.

Corals and sea anemones seem to be pretty immune to realistic concentrations of oil and oil dispersants. LC50 values were 30 to 250 ppm for the dispersant, higher for the oil. There was a nice mention of sublethal coral and anemone behavior - tentacle waving - that seemed to be a good indicator of insipient damage.

Turtle eggs and development - snapping turtles - are bomb proof to oil on the beach trickling down through the sand. This surprised and delighted a lot of the audience. The author is going to work next on the permeability of marine turtle egg shells.

One interesting sociology/economics type talk involved polling people to determine what it would take to replace Padre Island (a long barrier island off Texas near Corpus Christi). There are several smaller barrier islands nearby. In order to make them as equally attractive as Padre Island, the substitute islands would (1) have to be mechanically cleaned, (2) car free) and (3) have lifeguards and bathrooms. Negative features included concession stands (surprisingly), distance, crowds, etc. The author was trying to put a monetary value on loss of recreational resources in the event of a an oil spill off Padre Island. I was thinking that a similar study (884 people in a questionnaire) could be used to justify bacterial-loading reductions in southern California.

That's pretty much it. This is the 5th year of the program and these reviews seem to occur in a different region each year.

ID	CAPTURED	IDEAS	DESCRIPTION	REFERENCE	DATE	REMARKS
1	M-R	Technology: Airborne Oil Spill Sensor	(1) LURSOT System: Laser Ultrasonic Remote Sensing of Oil Thickness - three-laser system / measures oil thickness (2) SLEAF: new generation laser fluorosensor	http://www.ecy.wa.gov/programs/spills/response/taskfo	2001	Has useful information regarding new/effective technology
2	M-S	Technology: Underwater Spectroscopic Detector	Detects oil spills in aqueous environments. Includes: buoyant container having optical window; optical energy generator, optical detector, and beam splitter	http://www.freepatentsonline.com/5929453.html	7/27/1999	Not new technology, but can be useful
3	M-T	Technology; Aerial Infrared Thermography	Infrared camera (IR) system flown from small aircraft	http://www.flirthermography.com/media/22%20Stocktor	4/18/2006	Has useful info. on the end products and future goals
4		Website: NOAA 's National Ocean Service (Office of Response and Restoration)	Part B: Review/Select Potential Options and Products Elastec/American Marine – world leaders in oil spill recovery: Products/Equipment: skimmers, booms, fire boom, dispersant equipment, portable tanks, vacuum sytems, boats, pumps	http://response.restoration.noaa.gov/book_shelf/673_p	Jan-03	Good use of charts/tables to compare pros and cons of products/technology
5		Company: Elastec/American Marine (Oil Spill Equipment/Products)		http://www.elastec.com/oilSpillEq.html	Updated May 2004	Good point of contact in regards to oil spill equipment/products
6	M-U	Improved Recovery: Tailored Surfaces In Oleophilic Skimmers	Oleophilic skimmer drums covered w/ polymeric materials were fabricated, installed in a standard skimmer body and tested at the field scale in the Ohmsett facility test tank. the study increased the understanding of the interactions between oil and the material of the recovery unit and identified operational conditions that will result in higher oil recovery efficiency.	http://www.epa.gov/oilspill/pdfs/BrojeV_Final_FSS%20	Recent	Very useful information about test procedures conducted using tailored surfaces in oleophilic skimmers
7	M-V	Sensor/Modeling Network Technology: WAVe Current Information System (WAVCIS)	WAVCIS provides a highly unique online information database for multiple uses. It is anticipated that the program will ultimately provide numerous benefits to oil spill contingency planning including: enhancing cursory assessment of oil spill migration; precision numerical modeling of nowcasts for oil spill trajectories; an important archived data set to skill assess trajectory modeling; real-time environmental conditions for vessel operators involved in the application of dispersants and in situ burning; and, in addition to nowcasts, assist in forecasting conditions and spills for neighboring states.	http://wavcis.csi.lsu.edu/pubs/02.pdf	2001	The Louisiana coast is using WAVCIS; a state-of-the-art monitoring program, which provide a highly unique online information database. Good point of contact. New technology we can look into.
8	M-W	Computer-based Response System: OILMAP Oil Spill Model	OILMAP is a state-of-the-art, personal computer based oil spill response system applicable to oil spill contingency planning and real time response for any location in the world. The OILMAP suite includes: a trajectory and fates model for surface and subsurface oil, an oil spill response model, and stochastic and receptor models.	http://www.mms.gov/offshore/PDFs/CWFiles/03.pdf	Aug-06	Experimental Simulation Modeling: The OILMAP model was used to simulate spill trajectories and determine probabilities of areas being oiled and oil travel times for a instantaneous release of 40,000 gal (150,000 L) of electrical insulating oil at the ESP site in Nantucket Sound.
9		Technology/Oceanographic Sensor: Acoustic Doppler Current Profiler (ADCP)	OILMAP provides rapid predictions of the movement of spilled oil. It includes simple graphical procedures for entering both wind and hydrodynamic data and specifying the spill scenario. The ADCP is bottom mounted, upward looking and has a pressure sensor for measuring tide and mean water depth. Time series of velocities are accumulated and from these time series, velocity power spectra are calculated.	http://www.appsci.com/oilmap/moreinfo.htm http://wavcis.csi.lsu.edu/pubs/02.pdf	Web accessed on: 5/24/07 2001	Also see the demo. It has an example of an OILMAP animated output. ADCP is an added addition to the WAVCIS program, which provides current velocity profile data and wave data through newly developed software.
10		New Technology: Petroleum Remediation Product (PRP)	Petroleum Remediation Product (PRP) is a new way of cleaning up spills. It consists of thousands of microcapsules - tiny balls of beeswax with hollow centres, containing live microorganisms and nutrients to sustain them. As oil flows through the microcapsule's shell, it is consumed and digested by the microorganisms. Pressure build-up causes the PRP to explode and the enzymes, carbon dioxide and water are released into a 'BioBoom' used in conjunction with PRP which prevents contaminated water from spreading.	http://www.sti.nasa.gov/tto/Spinoff2006/er_1.html	2006	Good resource and product descriptions/ new and improved basic technology
11		New Technology: Online Environmental Surveillance (basic sensor): OSIS system structure	Within the OSIS system, data is trans-mitted to the onshore central serv-er (CS) from sensor packs placed on different offshore structures or vessels around the world. In the CS, the automated decision soft-ware transfers the sensor data into oil spill information and presents the result.	http://www.scandoil.com/moxie_issue/issue_7-8/2004_	8/1/2004	Good piece of communication technology that will help detect oil spill quicker and increase recovery rate. Plus it can be attached to offshore structures and vessels.
12		New Technology/Sensor: Multi-channel UV-Vis aerial imaging sensor	This project aimed to develop an algorithm that would enable the measurement of oil slick thicknesses using multispectral aerial imagery in the UV-Visible-NearIR spectral range. Using an existing 4-channel sensor the project was also designed to evaluate the feasibility of developing a relatively economical, portable aerial oil spill mapping system that could be operationally deployed.	http://www.mms.gov/tarprojects/544/544AA.pdf	7/31/2006	There are still recommendations for improvements, but this new tech. has proven to be effective in measuring oil film thickness.
13		New UV Technology: UV oil detection light: ColorLight AB (Sweden)	The Bright New Light for poor visibility conditions using UV-Technology. Smart Remote Control with a unique combination of very useful functions.	http://findarticles.com/p/articles/mi_m3159/is_4_223/ai_	Apr-02	Swedish Company, ColorLight has tested this and is low-budget, cost-effective. Can be attached to vessels and aircraft. Good for bad weather conditions day and night.

				http://www.colorlight.com/	Web Swedish product site accessed on: 5/22/07	ColorLight main website (Sweden)
				http://www.footprints-international.com/uploads/Brochu	Web U.S. product site accessed on: 5/22/07	Footprints International main website (United States). Footprints International is the U.S. representative for this product. You can order through them. Also check out their pdf files for product brochures and additional information.
14		Portable Solar-Powered LED Lantern	SolarLED Lantern uses sunlight to power LED lamp, which provides light for up to 24 hrs on fully-charged battery. It features built-in handle, rechargeable battery, photovoltaic solar panel, and 100,000 hr LED cluster lamp. Linear-configured lamp has 36 White 1206 SMT LEDs on double-sided PCB. Solar panel connects to lantern by 5½ ft cable, allowing it to be positioned for maximum light. ABS plastic body makes lantern resistant to dents, scratches, and foul weather.	http://news.thomasnet.com/fullstory/24573/2243	Release Date: June 30, 2003	Check their product website: http://www.ledtronics.com/
15		Renewable Energy Solar Charged Bright White LED Compact Lantern	Bright White LED Compact Solar-Powered Lantern uses stored sunlight energy to power LED lamp of 3.4-end-ft-candle intensity, providing bright light for up to 25 hr on fully-charged battery. Measuring 8.125 in. high and weighing 2.2 lb, lantern has rugged ABS plastic body that provides resistance to dents, scratches, and foul weather. Child-safe product comes with built-in handle, solar panel, ac/dc power supply, car power supply adapter, and 4 rechargeable batteries.	http://news.thomasnet.com/fullstory/485485	Release Date: May 18, 2006	Check their product website: http://www.ledtronics.com/
16		Automatic Identification System (AIS): TITAN AIS Display Software	Automatic Identification Systems (AIS), will allow ships to exchange ID, position, course, speed and other vital data, with all other nearby ships and shore stations through a standardized transponder system. The data exchange will be totally automatic and transparent to the users. The result will be a dramatic improvement in situational awareness for officers of the watch, who will have a clear and unambiguous identification, as well as other vital information, from all other AIS-equipped ships.	http://www.xanatosholdings.com/index_files/AISOverv	Canada product site: 5/23/07	Check their product website: http://www.xanatosholdings.com/index_files/AISProducts.htm
				http://www.xanatosholdings.com/index_files/TitanServe	Canada product site: 5/23/07	Check their product website: http://www.xanatosholdings.com/index_files/AISProducts.htm
17		New Cell Phone Technology: Sprint Introduces Trio of Motorola Devices: MOTOKRZR (pictured), MOTORAZR, and MOTOSLVR	Each Motorola device utilizes a high-speed EVDO network, features PAM (phone as modem), a camera, Bluetooth technology, and Telenav GPS.	http://www2.sprint.com/mr/news_dtl.do?id=13640	Announcement date: 10/3/06	Chuck was the one who suggested this new product. I think it would be tremendously beneficial for our oil spill response technology project. *See my comments on the separate word document on the article*
				http://www.gearlive.com/index.php/news/article/sprint-ir	Announcement date: 10/3/06	Chuck was the one who suggested this new product. I think it would be tremendously beneficial for our oil spill response technology project
18		Website: GPS/GIS Product listing	Contains a whole assortment of GPS/GIS product and vendor names as well as product descriptions for each.	http://ecat.giscafe.com/product_list.php?category_id=3	Web product site accessed on: 5/24/07	Has a good selection of GPS/GIS products
19		New Technology: Ultra Violet Cyclops Sensors	Crude Oil Cyclops can be used to monitor oil dispersal during spill response efforts, mapping programs or on monitoring platforms.	http://www.turnerdesigns.com/newsletter/newsletter_01	New product release: January 15, 2007	New line of UV sensors. Check the website link.
20		Technology: 10-AU-005-CE Field Fluorometer: Turner Designs	The 10-AU-005-CE Field Fluorometer is a rugged, field-portable instrument that can be set up for continuous-flow monitoring or discrete sample analyses.	http://www.oilinwatermonitors.com/products/1au005.htr	Web product site accessed on: 5/29/07	Has plenty of features as well as options
				http://www.oilinwatermonitors.com/pdf/10au.pdf	Web product site accessed on: 5/29/07	Check this link: Has a pdf file describing the product in detail
21		New Technology ASA Models: SIMAP and CODAR	locations and concentrations, winds, and surface and	http://www.appsci.com/news/2007/february2007.htm	Feb-07	indicated that dye movements were better represented by the
22		New Technology: Version 6.0 of ASA's OILMAP and SARMAP	power of web services to immediately access weather	http://www.appsci.com/news/2007/february2007.htm	Feb-07	
23		New Technology using ScanEx SAR: RADARSAT-1 and Envisat-1	SAR is useful for searching large areas and observing oceans at night and under cloudy weather conditions. RADARSAT-1 and Envisat-1 are the two main providers of satellite SAR images for oil spill monitoring.	http://marte.dpi.inpe.br/col/dpi.inpe.br/sbsr@80/2006/1	Apr-07	ScanEx SAR integral technology was successfully tested to detect oil spills in the Caspian Sea. See pdf file for images.
24		New Technology/CODAR Ocean Sensors: The SeaSonde	CODAR SeaSonde HF Radars is a compact, non-contact surface current and wave measurement system that can be deployed and maintained easily, and will perform even during extreme weather conditions.	http://www.codaros.com/images/products/seasonde_pr	Web product site accessed on: 5/30/07	I think this is probably the most up to date HF ocean sensor I have come across.
				http://www.codaros.com/seasonde.htm	Web product site accessed on: 5/30/07	
25		Mobile Computer: Panasonic Toughbook 19 and 30	The Toughbook 19 was designed using the military's MIL-STD-810 test procedures that measure equipment durability under harsh conditions – and it passed with flying colors. And the Toughbook 30 is the first notebook to deliver fixed mount screen brightness – 1000 Nit – in a portable computer, for unparalleled outdoor readability.	http://www.panasonic.com/business/toughbook/fully-ru	Web product site accessed on: 5/30/07	See online website for more information on product details

				http://www.panasonic.com/business/toughbook/noteboo	Web product site accessed on: 5/30/07	Contains other resourceful products
26		Possible future recovery plan? Better Bugs for Oil Spills	Oil-eating bacteria offer new hope for bioremediation. Scientists in Europe have sequenced the genome for an oil-eating bacterium, a move that could pave the way for faster and more efficient ways to clean up oil spills.	http://www.technologyreview.com/read_article.aspx?id=	31-Jul-06	Fun and interesting read
27		New Technologies: Oil Skimming (Abanaki Corporation)	Abanaki Corporation has released a new series of online animated demos that illustrate the technology behind its leading models of oil skimming equipment. Abanaki's online demos illustrate the technology behind the following six products: **(1) The Oil Grabber Model 8** is the company's most widely used oil skimmer, utilizing a continuous belt and wiper to remove up to 40 gallons of oil per hour from the fluid surface. Its rugged design allows its use in even the harshest applications. **(2) The Tote-it portable oil skimmer** removes up to 12 gallons of oil per hour and is easy hand carried from application to application. It light weight portability with a heavy duty industrial duty design. **(3) The Solar-Powered PetroXtractor** is designed for use in monitoring wells and other small openings with large vertical drops to depths of up to 100 feet. Its self sufficient design makes it suitable for use in even the remotest applications. **(4) The Q-VAC 100** is powerful wet vacuum that attaches easily to a standard drum to remove coolant from machine sumps or clean up spills. Requiring no electricit	http://www.pollutiononline.com/content/news/article.asp	21-May-07	
			Online demos:	http://www.abanaki.com/animated_demos.html?referre	We product site accessed on: 5/30/07	See link for online demos
28		Sorbent Materials	Three sorbents were compared in order to determine their potential for oil spill cleanup. Polypropylene nonwoven web, rice hull, and bagasse with two different particle sizes were evaluated in terms of oil sorption capacities and oil recovery efficiencies.	http://www3.interscience.wiley.com/cgi-bin/fulltext/1121	29-Nov-05	All three sorbents proved to be effective and have minimal harmful effects on ecosystems and low priced compared to other methods of oil spill cleanup.
29		Technology: Oil-on-water petroleum detection sensor	An optical non contact oil spill detection sensor that creates an automated system that remotely monitors for petroleum spills and sheens and provides instant (near real time) notification to authorities or users if and when a spill occurs.	http://ieeexplore.ieee.org/iel5/10918/34367/01639942.p	27-Jun-05	
30		New Technology: In Situ Technique- Electrical conductivity measuring device	The technique was based on the concept of the electrical conductivity to characterize and to measure the thickness of an oil layer in seawater. The design consists of five main components: glass container (1 litre) which holds the seawater; DC power supply (0 – 15 V) to provide electrical current or voltage difference; two electrodes (conductors); wires; and digital multimeter to measure current that was given by the DC power supply.	http://www3.interscience.wiley.com/cgi-bin/abstract/113	20-Jul-06	Interesting new technology that is innovative, cost-effective, and easy to use. It can be installed at different locations in the marine water and at different depths.
31		New Technology on Prevention: "Slick Sleuth™" oil spill detection sensor	An automated system that remotely monitors for petroleum spills and sheens and provides instant (near real time) notification to authorities or users if and when a spill occurs.	http://ieeexplore.ieee.org/iel5/10918/34367/01639942.p	Published 2005	Locally tested here in San Diego. Proven effective during testing of different forms of oils. The Slick Sleuth™ unit is a downward looking, non-contact optical sensor, which is installed above the water.
				http://www.interoceansystems.com/oil_osds.htm	Web product site accessed on: 6/1/07	
32		New Technology: Oil spill identification system using microwave radiometer (MWR) and radar unit	The system is used primarily on fixed offshore structures, but may also be used on fixed onshore constructions. The sensor comprises a combination of a radar and at least a microwave radiometer.	http://www.google.com/patents?hl=en&lr=&vid=USPAT	7-Mar-06	Once you download the pdf file, read the "product/system claims" at the last pages of the document (pages 26-29)
33		Technology Website: OSIS Sensor System Products	The OSIS Sensor system is an efficient tool for oil spill identification, tracking and quantification. The total system consists of the five central elements and the overall System Description and System Design are available in pdf format.	http://www.osis.biz/ss127.asp	Web product site accessed on: 6/1/07	See product site to download documents. The five central elements are all described in the DataSheets, which are all in pdf format and available for download.
34		Technology Website: PISCES2 (Potential Incident Simulation Control and Evaluation System)	PISCES2 is an incident response simulator intended for preparing and conducting command centre exercises and area drills. The application is developed to support exercises focusing on oil spill response	http://www.transas.com/products/simulators/pisces/	Web accessed on: 6/1/07	
35		Technology Website: GNOME (General NOAA Operational Modeling Environment)	GNOME is the oil spill trajectory model used by OR&R Emergency Response Division (ERD) responders during an oil spill. ERD trajectory modelers use GNOME in Diagnostic Mode to set up custom scenarios quickly.	http://response.restoration.noaa.gov/type_subtopic_ent	Web accessed on: 6/1/07	To use GNOME, you describe a spill scenario by entering information into the program; GNOME then creates and displays an oil spill "movie" showing the predicted trajectory of the oil spilled in your scenario.
			Latest news on GNOME product	http://response.restoration.noaa.gov/type_topic_entry.p	Web accessed on: 6/1/07	See link for latest news on products

36		Technology Website: Airborne sensor - LIDAR	LIDAR operates on the same principles as RADAR except that it uses light rather than radio waves to collect information. LIDARs consist of a source transmitter, receiver, and detector system. All uses of LIDAR involve laser light operated in the UV, visible, or infrared wave range that is transmitted toward a target. The light interacts with the target where it is either absorbed or reflected/scattered back to a measuring device.	http://clu-in.org/programs/21m2/openpath/lidar/	Web accessed on: 6/4/07		
37		Technology: Airborne sensor - LIDAR	Airborne 1 Corporation provides advanced LiDAR technology and asset management for partners in the photogrammetry, surveying and mapping fields. Company website Airborne 1 Corporation url:	http://www.directionsmag.com/press.releases/index.ph http://www.airborne1.com/	Web accessed on: 6/4/07	30-Jan-07	See pdf file on LIDAR ad found on this article. Could be a good source when it comes to new and updated LIDAR technology. See website for up to date info. on LIDAR
38		New Technology: AIS Communication Devices (Radar Plus and Blue Force Tracker)	The high-sensitivity, long-range Radar Plus provides maximum AIS reception while the all new Blue Force Tracker combines AIS with MURS encrypted communications for law enforcement, harbor control, SAR and other applications. Shine Micro Price Listing	http://www.shinemicro.com/docs/USCGInnovationExpo http://www.shinemicro.com/docs/ShineMicroPriceList0(	Web accessed on : 6/4/07	26-Jun-06	
39		Technology: Incident Management System Software: AIMSonScene SU	AIMSonScene SU is a software for area commanders and incident commanders who must actively manage strategy, tactics, and hazards. The software is the fastest, simplest, and easiest alternative to tactcal worksheets and tactical magnet boards. Company Website: Field Soft	http://www.fieldsoft.com/pdf/aimsonscene_single_user. www.fieldsoft.com	Web accessed on: 6/4/07	2006	See website for product details

TECHNOLOGY EXCERPTS AND SUMMARIES
FROM INTERNET RESEARCH

By: Shayne Camantigue

1. Title: "Airborne Oil Spill Sensor Testing: Progress and Recent Developments" (pdf file)

ABSTRACT: *It is now possible to measure the thickness of an oil slick on water by remote sensing. A laboratory sensor has been developed to provide this absolute oil slick thickness measurement. A joint project between Environment Canada, U.S. Minerals Management Service (MMS), Imperial Oil Research Ltd., and Industrial Materials Institute of the National Research Council of Canada has led to the development of a prototype slick thickness measurement system, known as the Laser Ultrasonic Remote Sensing of Oil Thickness (LURSOT) sensor. This prototype was the first step in achieving the ultimate goal of providing an airborne sensor for the remote measurement of oil slick thickness on water. The LURSOT sensor employs three lasers to produce and measure the time-of-flight of ultrasonic waves in oil, hence providing a direct measurement of oil slick thickness. The successful application of this technology to the measurement of oil slick thickness will benefit (1) the scientific community as a whole by providing information about the dynamics of oil slick spreading and (2) the spill responder by providing a measurement of the effectiveness of spill countermeasures such as dispersant application. The first part of this paper provides initial results from laboratory testing prior to a second round of airborne test flights of the modified LURSOT system. The second part of this paper provides details on a new generation of laser fluorosensor, known as Scanning Laser Environmental Airborne Fluorosensor (SLEAF). SLEAF recently has been installed on Environment Canada's DC-3 aircraft. SLEAF incorporates a high-power excimer laser, high-resolution range-gated intensified diode-array spectrometer, and a pair of variable speed and angular displacement scanning mirrors. These scanning mirrors provide SLEAF with the across-track sampling pattern needed to detect narrow bands of oil that can pile up along the high tide lines of beaches and shorelines. Ground testing of SLEAF has now been underway for some time. This paper provides details of the sensor installation and testing program, and illustrates the operational capabilities of the new system. It is believed that this new sensor will provide prompt reliable detection and mapping of oil contamination in a variety of marine and terrestrial environments.*

2. Title: "Underwater Spectroscopic Detector"

The present invention provides a spectroscopic detector suitable for detecting oil spills in an aqueous environment and includes a structure having an optical window; an optical energy generator supported by the structure for directing an optical energy beam through the window; an optical detector for generating an output signal in response to detecting a second optical energy beam received in the container through the window; and a beam splitter for directing the second optical energy beam to the optical detector. The generation of the optical energy beam and operation of the optical detector may be modulated to reduce thermal noise while minimizing the influence of background light on

the output of the detector. The optical energy beam preferably has UV components which inhibit the formation of biological organisms on the optical window.

3. Title: "Advances In Selected Applictions And Methodology For Aerial Infrared Thermography" (pdf file)

ABSTRACT. In applications where a straight-down view or large area view is needed: or wehre long distances must be covered in a limited amount of time, aerial infrared thermography is superior to ground-based infrared. The selection of the aircraft, camera mount, infrared imager, navigational aids, recovering medium, workstation computer equipment, pilot and crew are critical to success. There are inherent dangers to flying low, slow and in the middle of the night. The job must be done right and safely…the first time. This paper focuses on recent and ongoing advances in methodology, platform and software that will bring the end-user a superior product.

4. NOAA 's National Ocean Service: Office of Response and Restoration

Part B: Review/Select Potential Options and Products (pdf file)

Provides decision-makers with the means for evaluating spill response strategies and products in a detailed manner. It facilitates easy review and comparison of individual products and strategies to evaluate their potential value to the individual response conditions. You will use the *Product Selection Worksheet (Worksheet 2)* to facilitate review and comparison of the products.

5. Company: Elastec/American Marine – world leaders in oil spill recovery

Sells Oil Spill Equipment: skimmers, booms, fire boom, dispersant equipment, portable tanks, vacuum sytems, boats, pumps

See link: http://www.elastec.com/oilSpillEq.html#

6. Title: "Improved Recovery Of Oil Spills From Water Surfaces Using Tailored Surfaces In Oleophilic Skimmers" (pdf file)

ABSTRACT. The primary objective of this research was to perform a full-scale test of novel oleophilic drum recovery surfaces tailored for oil spill recovery, and to determine the relation between the operational parameters and oil recovery efficiency. There were a number of studies undertaken by the government and private companies in order to test the recovery efficiency of various skimmers (e.g. Foreman and Talley, 2002; Hvidbak, 2001; and Schwartz, 1979). These studies allowed to analyze the recovery efficiency of various skimmers, but did not evaluate or report the influence of the operational parameters such as spill thickness, surface pattern, ambient temperature, drum rotation speed, etc. on oil recovery efficiency. The skimmers tested in these studies had different configurations, dimensions, capacities and recovery modes; and in most cases several operational parameters were changed simultaneously during each test making it

impossible to distinguish the effect of each variable separately. The current study specifically evaluated both design and operational parameters independently, thus providing key information on the influence of these parameters on the overall oil recovery efficiency.

7. Title: "A New Wave-Current Online Information System for Oil Spill Contingency Planning (WAVCIS)" (pdf file)

ABSTRACT. An online oceanographic and meteorological observing system has been developed and is being implemented off the Louisiana coast to provide critical information during offshore emergencies including oil spills. The program, WAVCIS (WAVe Current Information System), provides wave information (sea state) including wave height, period, direction of propagation, water level, surge, water column velocity profiles, and meteorological conditions on a near real time basis. Information of this sort does not exist for an area approximating 135,000 km2 off Louisiana's coast. WAVCIS involves offshore deployment of instrumentation around the entire state in order to provide near real time data describing sea state, current velocity and meteorological conditions. Information from each station is transmitted via cellular satellite telephone to a base station at Louisiana State University where it undergoes quality control, post-processing and archiving in an online database. The information is then made available on the World Wide Web and is accessible to computers with an Internet connection and web browser. Various data displays are available for the near real time information, as well as a specified time history for archived data.

8. OILMAP Oil Spill Model (pdf file) p. 21-22

4.1 Model Description:

OILMAP is a state-of-the-art, personal computer based oil spill response system applicable to oil spill contingency planning and real time response for any location in the world (Jayko and Howlett, 1992; Spaulding et al., 1992a, b). OILMAP was designed in a modular fashion so that different types of spill models could be incorporated within the basic system, as well as a suite of sophisticated environmental data management tools, without increasing the complexity of the user interface. The OILMAP suite includes: a trajectory and fates model for surface and subsurface oil, an oil spill response model, and stochastic and receptor models.

The trajectory and fates model predicts the transport and weathering of oil from instantaneous or continuous spills. Predictions show the location and weathering of the surface oil versus time. The model estimates the temporal variation of the oil's areal coverage, oil thickness, and oil viscosity. The model also predicts the oil mass balance or the amount of oil on the water surface, in the water column, evaporated, on the shore, and outside the study domain versus time. The fate processes in the model include spreading, evaporation, entrainment or natural dispersion, and emulsification. As an option OILMAP can also estimate oil-sediment interaction and associated oil sedimentation.

For the subsurface component, oil mass injection rates from the surface slick into the water column are performed by oil droplet size class using an entrainment formulation. The subsurface oil concentration field is predicted using a particle based random walk technique and includes oil droplet rise velocities by size class. Resurfacing of oil droplets due to buoyant effects is explicitly included. If oil is resurfaced in the vicinity of surface spillets, the oil is incorporated into the closest surface spillet. Otherwise, a new surface slick is created.

In the stochastic mode, multiple spill simulations are performed varying the environmental data used to transport the oil. Either winds, currents, or both may be stochastically varied. The multiple trajectories are then used to produce contour maps showing the probability of surface and shoreline oiling. The trajectories are also analyzed to give travel time contours for the spill. These oiling probabilities and travel time contours can be determined for user selected spill durations. If resource information is stored in the GIS database, a resource hit calculation can be performed to predict the probability of oiling important resources.

OILMAP has been applied to hindcast a variety of spills. These hindcasts validate the performance of the model. Hindcasts of the *Amoco Cadiz*, Ixtoc and Persian Gulf War spills and an experimental spill in the North Sea by Warren Springs Laboratory are reported in Kolluru et al. (1994). Spaulding et al. (1993) also present a hindcast of the Gulf War spill. Spaulding et al. (1994) present the application of the model to the *Braer* spill where subsurface transport of the oil was critical to understanding the oil's movement and impact on the seabed. Spaulding et al. (1996a) applied the model to hindcast the surface and subsurface transport and fate of the fuel oil spilled from the *North Cape* barge. Integration of OILMAP with a real time hydrodynamic model and the hindcast of the movement of oil tracking buoys in Narragansett Bay are presented in Spaulding et al. (1996b).

The OILMAP model has been applied in a stochastic mode to estimate likely trajectories for a large number of proposed oil related developments throughout the world. The approach used and the results obtained have been reviewed and accepted by many regulatory agencies in North America, Europe, the Middle East, Asia, Australia and South America.

This is a link that shows a demo of an OILMAP:

http://www.appsci.com/oilmap/demo.htm

9. Acoustic Doppler Current Profiler (ADCP) (pdf file) p. 5-7

2.3 Acoustic Doppler Current Profiler

The Acoustic Doppler Current Profiler (ADCP) is an exciting addition to the WAVCIS program that not only provides current velocity profile data, but also wave data through newly developed software. The ADCP provides a profile measurement of water current from as close as one meter to the surface, to within one meter of the bottom. A considerable effort has been invested in working with RD Instruments to obtain wave data from the ADCP's. Given that this is new technology, a more detailed description is provided below.

2.31 Principles of ADCP Wave Measurement

The basic principle behind wave measurement, is that the wave orbital velocities below the surface can be measured by the highly accurate ADCP. The ADCP is bottom mounted, upward looking and has a pressure sensor for measuring tide and mean water depth. Time series of velocities are accumulated and from these time series, velocity power spectra are calculated. To get a surface height spectrum the velocity spectrum is translated to surface displacement using linear wave kinematics. The depth of each bin measured and the total water depth are used to calculate this translation. To calculate directional spectra phase information must be preserved. Each bin in each beam is considered to be an independent sensor in an array. The cross-spectrum is then calculated between each sensor and every other sensor in the array. The result is a cross-spectral matrix that contains phase information in the path between each sensor and every other sensor at each frequency band. The cross-spectrum at a particular frequency is linearly related to the directional spectrum at a particular frequency. By inverting this forward relation we solve for the directional spectrum.

2.32 Background

The use of Doppler sonar to measure ocean currents is by now well established, and is documented in the RDI publication Acoustic Doppler Current Profilers, Principles of Operation (RD Instruments, 1989). Conventional acoustic Doppler current profilers (ADCPs) typically use a Janus configuration consisting of four acoustic beams, paired in orthogonal planes, where each beam is inclined at a fixed angle to the vertical (usually 20 - 30 degrees). The sonar measures the component of velocity projected along the beam axis, averaged over a range cell whose along-beam length is roughly half that of the acoustic pulse. Since the mean current is assumed to be horizontally uniform over the beams, its components can be recovered by subtracting the measured velocity from opposing beams. This procedure is relatively insensitive to contamination by vertical currents and/or unknown instrument tilts (RD Instruments, 1989).

The situation regarding waves is more complicated. At any instant of time the wave velocity varies across the array. As a result, except for waves that are highly coherent during their passage from one beam to another, it is not possible to separate the measured

along-beam velocities into their horizontal and vertical components. However, the wave field is statistically steady in time and homogeneous in space, so that the cross-spectra of velocities measured at various range cells (either between different beams or along each beam) depend on wave direction. This fact allows us to apply array processing techniques to estimate the frequency-direction spectrum of the waves. In other words, each depth cell of the ADCP can be considered to be an independent sensor that makes a measurement of one component of the wave field velocity. The ensemble of depth cells along the four beams constitutes an array of sensors from which magnitude and directional information about the wave field can be determined.

2.33 ADCP Performance as a Wave Gauge

The ADCP can use its profiling ability (bins and beams) as an array of sensors. Because the ADCP can profile the water column all the way to the surface, it can be mounted in much deeper water than a traditional pressure (PUV triplet) based device. Higher frequency waves attenuate more quickly with depth below the surface.

The ADCP can measure much higher frequency waves than a PUV and do so in deeper water, because it can make measurements higher up in the water column. Additionally, the ADCP has many independent sensors (bins-beams) so even when sampling at a 2Hz sample rate the data is as quiet as if it had been sampled at 200Hz by a single point meter. To achieve the best possible solution for wave height spectrum the height spectrum and the noise spectrum are fit to the bin-beam data using a least squares fit (see Height Spectrum for details). In addition to the orbital velocity technique for measuring wave spectra, the ADCP can measure wave height spectra from its pressure sensor (with frequency/depth limitations) and from echo ranging the surface. Within the frequency range of the pressure sensor the pressure height spectrum is an old reliable reference for data comparison. The surface track measurement of wave height is reliable most but not all of the time. The advantage of the surface track derived height spectrum is that it is a direct measurement of the surface and can measure wave energy at very high frequencies, higher than 0.9 Hz in some installations. Having three completely independent measures of wave height spectrum that all agree very closely is a solid argument for data quality.

The directional spectrum is much truer and of higher quality than any sort of triplet (PUV, UVW, PRH) and is almost as good as large home-built arrays. The Maximum Likelihood Method used for inversion allows one to independently resolve the wave field in each direction. The full circle (360 degrees) is arbitrarily divided into as many slices as one chooses (up to 360 slices of 1 degree width). Because of this the RDI directional spectra algorithm can resolve two separate swells arriving from different directions at similar frequency. This feat is impossible using traditional triplet algorithms. The ADCP measures a sparse array and as such it cannot achieve the aperture of expensive home built arrays, however, the aperture of the beams gives the ADCP a significant improvement in directional accuracy over single point measurements. A traditional triplet algorithm uses only the first three terms in a Fourier series so it can identify a single directional peak particularly at longer wavelengths. However, bouys, PUV’s other triplets cannot accurately represent the multiple directional peaks or even the true directional distribution. In the ADCP wave algorithm there are many sensors giving an array with

many degrees of freedom and some aperture. The Maximum Likelihood Method used to calculate the directional spectrum has a smearing kernal associated with the inversion. By using the Iterative Maximum Likelihood Method the spreading of the directional spectrum can be corrected. The process is repeated until the directional spectrum converges to what the data actually supports. The spectrum will get narrower and sweep up directionally spread power into the peak as long as the measured data supports it. The result is a directional spectrum that more accurately represents the true directional distribution.

10. Title: "PRP: The Proven Solution for Cleaning Up Oil Spills"

PRP = Petroleum Remediation Product

Product Outcome

The basic technology behind PRP is thousands of microcapsules—tiny balls of beeswax with hollow centers. Water cannot penetrate the microcapsule's cell, but oil is absorbed right into the beeswax spheres as they float on the water's surface. This way, the contaminants—chemical compounds that originally come from crude oil such as fuels, motor oils, or petroleum hydrocarbons—are caught before they settle.

PRP works well as a loose powder for cleaning up contaminants in lakes and other ecologically fragile areas. The powder can be spread over a contaminated body of water or soil, and it will absorb contaminants, contain them in isolation, and dispose of them safely. In water, it is important that PRP floats and keeps the oil on the surface, because, even if oil exposure is not immediately lethal, it can cause long-term harm if allowed to settle. Bottom-dwelling fish exposed to compounds released after oil spills may develop liver disease, in addition to reproductive and growth problems. This use of PRP is especially effective for environmental cleanup in sensitive areas like coral reefs and mangroves.

This ecological wonder has also been packaged for specific uses by UniRemInc to create a variety of different commercial products, including the BioSok Bilge Maintenance System, the BioBoom, the WellBoom, and OilBuster.

One of the most popular uses for PRP is the BioSok Bilge Maintenance System. It allows boaters to clean up small spills. Boats take on water, either from rain, washing, or waves splashing over the sides. This water often mixes with cleaning fluids, and oil and gas from a boat's motor. The water collects in a bilge, the area inside a boat's bottom designed to collect and hold the errant water. A bilge needs to be pumped overboard regularly to prevent the boat from taking on too much water. This bilge water, though, is often contaminated.

The BioSok is a small, 3- by 10-inch "sock" with PRP encased in polypropylene that floats in the bilge, absorbing and bioremediating any hydrocarbons, thus,

decontaminating the water. Each BioSok can immediately absorb twice its weight and can degrade more than 20 times its weight in oil over time. One BioSok will generally last for an entire boating season. It requires no maintenance or monitoring, and it safely eliminates the pollutants and fumes associated with spilled oil and gasoline.

The U.S. Coast Guard is always on the prowl for any boaters who expel oil-contaminated water from their bilges. Fines are often thousands of dollars, which makes sense, knowing that every year bilge cleaning and other ship operations release millions of gallons of oil into navigable waters from thousands of discharges of just a few gallons each. The BioSok is such an effective antidote to polluted bilge water, that even the Coast Guard has used it on its boats.

UniRemInc also manufactures the BioBoom, essentially a longer BioSok that can be used to enclose larger oil spills. It is especially effective for emergency containment of spilled oil in large areas, like in marinas, ponds, lakes, or open waters; but can also be effective in tanks, storm runoff systems, electrical utility vaults, and anywhere that requires the containment, absorption, and biodegredation of leaking petroleum hydrocarbons. The BioBoom acts as a perimeter around spills and prevents them from spreading. The snake-like tube is 3 inches in diameter and can be produced at any length up to 10 feet.

The WellBoom facilitates groundwater monitoring by absorbing floating petroleum more effectively and less expensively than traditional bailing methods. UniRemInc makes the standard WellBoom by filling a weighted polypropylene sock, 36 inches long and up to 3 inches in diameter, with PRP. The product is then lowered into the groundwater monitoring wells where it absorbs and accelerates the biodegradation of any floating petroleum hydrocarbon contaminants. WellBoom is typically used at petroleum storage facilities, gasoline stations, and other locations where there is a potential for groundwater contamination.

OilBuster is yet another product using PRP that UniRemInc has developed. It is the beeswax PRP mixed with several grades of ground corncob and is for use on land or hard surfaces where no natural microbial population is present. It is ideal for cleaning oil spills that have not yet reached the water and that hopefully never will.

PRP has proven effective in facilities conducting railroad repair, where ballasts, ties, and the ground can be saturated with diesel fuel and oil. It is a safe, cost- effective way for these types of contaminated facilities to get quick results that restore the environment and help them avoid the steep U.S. Environmental Protection Agency fines.

UniRemInc is continuing to find uses for this amazing bioremediation technology and to supply consumers and industry with safe, natural, and effective ways to keep oil out of our water.

11. Article: “Online Environmental Surveillance”

Preventive measures have been taken worldwide to reduce the more than 500,000 tons of oil spilled into the marine environment every year, and the International Maritime Organization (IMO) is increasingly declaring sensitive sea areas as “Special Areas”, including the North Sea, where allowable discharges from vessels and offshore structures are reduced from 40 to 15 part per million.

The present strategy to deal with the oil pollution within “Special Areas” and the sporadic airborne surveillance used to enforce the strategy are proving inadequate. Because the technology required to implement and enforce the pro-grammes efficiently is not present-ly available, OSIS has sought to develop, manufacture and com-mercialise online environmental surveillance systems for vessels and offshore structures.

During the last 3 years, OSIS has designed and manufactured the first sensor with the ability to mon-itor oil spills from offshore struc-tures. The sensor has completed the first part of a comprehensive test programme, including onshore, calibration and offshore tests. The onshore tests programme was completed in fourth quarter 2003 and the calibration test pro-gramme was completed in first quarter 2004. The offshore test programme commenced in April 2004 and will continue through-out the year. The test results thus far have been promising. Apart from verifying the overall concept, technological sustainability has been confirmed.

OSIS is presently having a test installation operating onboard an offshore structure in the North Sea area.

Together with the environmental authorities, OSIS is contemplating a second development project – OSIS “Marine Transport” – specif-ically targeted at monitoring emis-sions from vessels. The project will start in December 2004 and will be based on the results obtained through the completion of the first project.

Environmental Challenge

In the “Special Areas”, including the North Sea, it is doubtful whether all oil spills are correctly reported. This has been evident during several occasions, where disparity between the amount measured by airborne surveillance and the amount reported from the offshore structure often results in cleanup actions being based on incorrect or non-objective infor-mation, resulting in inefficient action.

The vast number of offshore struc-tures operating within the “Special Areas” combined with the lack of efficient surveillance technology has so far caused exemption from the MARPOL 73/78 annex 1 direc-tive, so the OSIS sensor project will help to bring offshore structures in line with what is already imple-mented on vessels. Recent estimates state that one-third of all oil pollution of the world’s oceans is caused by “marine transportation” activities, often as a result of routine tanker operations and from the

discharge of oily wastes. To combat the prob-lem, increasing numbers of national, regional and interna-tional protocols have been or are being deployed by authorities. Completing the OSIS “Marine Transport” project will make possi-ble support of the general objec-tives of EU contributing to the implementation, updating and development of Community envi-ronment policy and legislation. Particularly, the project comple-tion will contribute to the objec-tives set out under the 6th Environment Action Program. The oil primarily originates from vessels, despite the fact that the Baltic Sea and North Sea are desig-nated as “Special Areas”. According to HELCOM (Baltic Marine Environment Protection Commission, Helsinki Commission), a single 24-hour aerial surveillance flight in 2002 observed 26 illegal discharges in the Baltic Sea suggesting that there could be as many as 10,000 illegal oil discharges in the Baltic Sea area every year.

Technical Solution

Applications for offshore structures and vessels require different tech-nical solutions. Although the basic sensor technology is similar in both applications, the mechanical structure and transmission system developed will be different. Both applications are based on electro-magnetic sensors with different frequency bands able to identify submissions from 0.02 to 2.0 millimetres of oil on a water surface.

The measurement capability corresponds to governmental requirements and the final result will:

Provide an objective measure of the amount of oil spilled or discharged into the marine environment.

Enhance the information for decision making concerning corrective action.

Enhance the opportunities for efficient cleanup procedures.

Support implementation of preventive legislation.

Support general procedures for operators.

Within the system, data is trans-mitted to the onshore central serv-er (CS) from sensor packs placed on different offshore structures or vessels around the world. In the CS, the automated decision soft-ware transfers the sensor data into oil spill information and presents the result. The transmission system facilitates wireless Ethernet between sensor packs and master unit (MU) and satellite link between the MU and CS. The MU enables up to 16 sensor packs to communicate through a single satellite connection. The scalability of the system is unlimited as the system can survey an unlimited number of offshore structures and vessels simultaneously enabling an unlimited number of worldwide users to access the database after registration in the OSIS CS.

OSIS system structure, showing shows three Sensor Packs, the Master Unit (MU) and Central Server (CS)

OSIS differentiates two system configurations: a comprehensive system including complete sensor pack, transmission system and presentation software as well as additional sensor pack's enabling expansion of the surveillance area within reach of a satellite link already established.

In order to mount equipment onboard offshore structures and vessels, approval of the equipment is required by marine classification societies. This secures compliance with marine regulations and makes the integration with stan-dard onboard equipment possible. So far, Det Norske Veritas (DNV) is used as certifying body.

Application for OffshoreStructures

The application for offshore structures is designed to provide round the clock surveillance and will provide target groups access to the illustrated information screens via a traditional web interface. The end user is presented with relevant information about the offshore structure, sensor measurements and, in case of an oil spill, the esti-mated contamination area and the amount spilled. Additional poten-tial benefits can be summarised as

Operational insight

The OSIS sensor system will ensure information on all operational spills and discharges, providing the exact data to be reported. Pollution from external sources drifting into OSIS sensor integration to the UAIS transponder system the monitored area, including pollution from vessels, are identified and documented.

Faster clean up procedures

The OSIS sensor system will provide the means to perform faster clean up procedures as the spill is monitored in real time and spill data is provided instantly.

Insurance differentiation

The OSIS sensor system will enable insurance differentiation for off-shore structures with installed surveillance

Access to exploration activity in sensitive marine areas

In the future, operators with a positive environmental profile are more likely to be approved for exploration activities in sensitive marine areas.

Application for Vessels

For vessels, this application contin-uously monitors individual vessels for oil spills and provides the authorities with objective data to link the oil spill to the polluter. Additionally, the sensor can be used as a forward looking instru-ment during cleanup operations. The OSIS vessel application is designed to interface with the Universal Automatic Identification System (UAIS) that, in accordance with IMO Resolution MSC.74 (69) annex 3, is mandatory by the end of 2004 on all vessels above 300 GRT. Interfacing the OSIS sensor system to the UAIS transponder facilitates the integration of envi-ronmental data with static-, dynamic- and voyage-related information for each individual vessel. This provides unambiguous identification of the polluter.
When no oil spill is observed – that is, 95 to 99% of the time – transmission of the OSIS data is integrated into the UAIS transmis-sion system and the information screens will indicate that no oil spill exists and all sensors are cali-brated. When the UAIS informa-tion screens indicate that an oil spill has been observed, data is transferred onshore through a sep-arate satellite link to the CS, giving decision makers direct access to data concerning contaminated area and volume.

Low Cost, High Value

The costs associated with oil spill identification sensors are linked to development of the oil spill sen-sors. Due to the high degree of automation, day-to-day operations will be inexpensive but provide 24-hour surveillance with a high degree of reliability irrespective of weather and daylight. Promising results from the OSIS sensor sys-tem for offshore structures indicate that the technology can be used to effectively monitoring illegal dis-charges and spills from both off-shore structures and vessels. Installing sensors directly on off-shore structures and vessels pro-vides a solution precisely focused on the problem and provide local governments with the means to implement national, regional and international protocols effectively. The regulatory enforcement will be strongly improved and enable the expensive aerial surveillance to be concentrated on oil spills being reported from the OSIS system. systems, resulting in lower insurance costs.

12. Title: "Real-time Detection of Oil Slick Thickness Patterns with a Portable Multispectral Sensor" (pdf file)

EXECUTIVE SUMMARY.

This project aimed to develop an algorithm that would enable the measurement of oil slick thicknesses using multispectral aerial imagery in the UV-Visible-NearIR spectral range. Using an existing 4-channel sensor the project was also designed to evaluate the feasibility of developing a relatively economical, portable aerial oil spill mapping system that could be operationally deployed. Such a system would enable rapid mapping of the extents and thicknesses of an oil spill with greater quantitative and geographical accuracy than is presently possible using visual observations. Using data obtained under smallscale laboratory conditions, larger-scale experiments at Ohmsett – The National Oil Spill Response Test Facility in Leonardo, New Jersey, and aerial and ship-based field sampling of slicks from natural oil seeps in California's Santa Barbara Channel a working oil thickness algorithm was developed for medium weight crudes and IFO-180 fuel oil. The algorithm is adaptive in that it estimates oil thickness using spectral reflectance deviations from existing water color background characteristics, thus allowing it to be applied in different geographical areas with different water color conditions. The algorithm can measure film thicknesses between sheens and approximately 0.4-0.5mm. The range could potentially be extended by adding an infrared sensor to the system.

The project proved that the development and operational utilization of a portable multispectral imaging system for oil spill mapping is very feasible and could provide major improvements in oil spill response. Further development, which could not be accomplished during this project's 18-month timeline, includes improvements in hardware and software that will allow better autogeolocation and processing of the data in near-real-time, integration of an IR camera with the system for increased thickness detection range, and acquisition of additional oil signature profiles under different atmospheric conditions.

13. Title: "New UV technology detects oil spills" - Technology from Europe: Sweden – ultraviolet (Article)

Detecting an oil spill at sea can be difficult even in broad daylight. In darkness and under severe weather conditions, it can be an almost impossible task. A black patch of oil on dark water is very difficult to see, even when illuminated by a searchlight from a boat or helicopter.

Over the years, oil companies, as well as the coast guard have tested a whole range of methods for detecting oil spills at night: IR radiation, radar, lasers and several types of night-vision systems. These methods are both expensive and complex, while consistently failing to provide a satisfactory solution.

Now, however, there is good reason to believe that ultraviolet (UV) light can solve the problem. A radically innovative type of searchlight, easily installed on boats, aircraft or on land, offers a highly effective tool for oil-spill detection.

The searchlight's special-frequency ultraviolet light--sometimes called a "black light"--cuts through darkness, fog, rain and snow. Oil spills that were previously impossible to detect can now be discovered at an early stage, thus offering greater environmental and financial benefits.

UV Technology. As is so often the case, the secret behind this technological breakthrough derives from a simple fact: Oil is fluorescent. In darkness, when UV light is directed at an oil film on water, the oil fluoresces in bright colors. The fluorescent properties of oil have long been common knowledge in scientific circles, although few, if any, have previously made the connection with oil-spill detection.

Fluorescence occurs when certain materials or substances are irradiated by a short-wave light source. The illuminated object retains the short-wave radiation for some millionths of a second, after which it is reflected as visible, longer-wavelength light. The reflected light can appear as violet, blue, green or any other color in the visible spectrum.

A new UV searchlight for oil detection.

The searchlights can be independently focused via a patented parabolic reflector with myriad angled steps, similar to a Fresnel lens. A key feature of the searchlight assembly is unlimited rotational movement of each light, independent of each other. The searchlight is fitted with dual slip-ring assemblies, uniquely allowing full and continuous rotation through 3600 in both vertical and horizontal planes. It can be remotely operated by a simple joystick control or wireless remote. In addition, it features a heavy stainless steel housing for durability and is IP 66 approved for heavy seas.

During the past few years, ColorLight, a Swedish company, has collaborated on product development with Goran Manneberg, Assistant Professor at The Royal Institute of Technology (KTH) in Stockholm. This effort has resulted in an offering of products and technologies virtually unique to the market. Today, a large number of the company's dual-headed halogen and UV searchlights are in service as an aid to rescue and navigation efforts for various coast guard, harbor-pilot and air/sea rescue agencies around the world.

While application-specific evaluations continue in this field, the unique UV technology offers promising results in oil spill detection. Rickard Sandgren, who heads the Fire & Security Department at Scanraff, one of Northern Europe's largest oil refineries said, "This could well be the technical solution we have sought for more than 15 years. Tests have shown that the UV searchlight can detect an oil spill in total darkness. We intend to purchase our own UV searchlight and test it on the Swedish west coast."

Footprints International main website (United States):

http://www.footprintsinternational.com/uploads/Brochure%20General.pdf

Footprints International is the U.S. representative for this product.

Check additional links posted on excel spreadsheet

14. Article: "Portable Solar-Powered LED Lantern Tells Batteries to Take a Hike"

TORRANCE, CA - June 30, 2003 - LEDtronics introduces the SolarLED Lantern, the newest addition to its expanding line of solar-powered Light Emitting Diode (LED) products. The SolarLED Lantern uses sunlight to power a high-intensity LED lamp that provides light for up to 24 hours on a fully charged battery. That's four times longer than a compact fluorescent lamp! The SolarLED Lantern features a built-in handle, a rechargeable battery, a photovoltaic solar panel, and a 100,000-hour LED cluster lamp. The linear-configured LED lamp has 36 White 1206 SMT LEDs (18 per side in two columns of nine) on a double-sided PCB. A nickel metal hydride battery, located within the base of the lantern, features memory-free recharging and a discharge circuit to prevent battery damage from excessive recharging. The lightweight, flexible and compact solar panel connects to the lantern by a 5 ½ - foot cable, allowing the panel to be positioned where it will receive maximum light. The SolarLED Lantern (battery installed) with the solar panel weighs 2.06 lbs. (934.4g). It is 8.9" (226mm) in height. The solar panel measures 8.25"W x 11.25"L (210nmm x 287mm). A rugged ABS plastic body makes the lantern resistant to dents, scratches and foul weather. The SolarLED Lantern is child-safe, ideal for camping and roadside/home emergency kits, and a terrific light source for areas where electricity is absent or unreliable.

The SolarLED Lantern eliminates the hazards (e.g., fires, burns, fumes, spills and explosions) of conventionally fueled lanterns, the trouble of primping fuel pumps, and the fuss of replacing mantles. Operating the SolarLED Lantern is clean and easy. Simply plug the solar panel into the lantern and set the panel in a sunlit area to charge the battery. Under bright sunlight, a dead battery takes 13 hours to fully charge. Recharging time varies with atmospheric and environmental conditions. Users can expect more than 500 charges before battery replacement is necessary, which not only saves the operator hundreds of dollars over the lifetime of the lantern, but also lessens the environmental impact associated with one-time-use batteries.

Light Emitting Diode (LED) technology with its inherent energy efficiency makes an excellent accompaniment to photovoltaic-based energy systems. Solid-state design renders LEDs impervious to electrical and mechanical shock, vibration, frequent switching and environmental extremes. With an average life span of 100,000-plus hours (11 years), LEDs operate reliably year after year and are virtually maintenance free.

Founded in 1983, LEDtronics leads where others only follow when it comes to designing, manufacturing and packaging state-of-the-art LEDs to meet the world's constantly

changing lighting needs. Our inventive product line encompasses an array of direct incandescent lamp replacement Based LED Lamps, low-cost snap-in and relampable Panel Mount LED Lamps and holders, high intensity sunlight-visible Discrete LEDs, PCB LEDs circuit board status indicators, surface mount diodes SMT LEDs, full-spectrum rainbow RGB LEDs and Infra-Red (IR) LEDs.

15. Article: "Renewable Energy Solar Charged Bright White LED Compact Lantern"

TORRANCE, CA - May 18, 2006 - LEDtronics® introduces the Bright White LED Compact Solar-Powered Lantern, the newest addition to their lineup of solar-powered Light Emitting Diode (LED) products. This compact lantern uses stored sunlight energy to power an LED lamp of 3.4-end-foot-candle intensity providing bright light for up to 25 hours on a fully-charged battery. That's nearly seven times longer than a compact fluorescent lamp! The bulb-styled LED-cluster lamp has 24 Incandescent-White (4000K) 5mm LEDs that are protected within a polycarbonate lens. The Compact LED Solar-Powered Lantern comes with a built-in handle, solar panel, AC/DC power supply, car power supply adapter, and four rechargeable batteries (4C Type) located within the base of the lantern that features memory-free recharging. A discharge circuit prevents battery damage from excessive recharging.

The Compact LED lantern (battery installed) with the solar panel weighs 2.2 lbs. (0.099Kg). It is 8.125in. (206.375mm) in height. The solar panel measures 4in. x 7.5in. (102mm x 190.5mm). A rugged ABS plastic body makes the lantern resistant to dents, scratches and foul weather. The compact LED lantern is child-safe, ideal for camping and roadside/home emergency kits, hunters, hikers, marine cabin lighting, earthquake emergency kits and a terrific light source for areas where electricity is absent or unreliable.

The compact LED lantern eliminates the hazards of conventionally fueled lanterns, the trouble of priming fuel pumps (e.g., fires, burns, fumes, spills and explosions), and the fuss of replacing mantles. Operating the compact LED lantern is clean and easy. Simply plug the solar panel into the lantern and set the panel in a sunlit area to charge the battery. Under bright sunlight, a dead battery takes 12 hours to fully charge. Recharging time varies with atmospheric and environmental conditions. Users can expect more than 500 charges before battery replacement is necessary which not only saves the operator hundreds of dollars over the lifetime of the lantern, but also lessens the environmental impact associated with one-time-use batteries.

LED technology with its inherent energy efficiency makes an excellent accompaniment to photovoltaic-based energy systems. Solid-state design renders LEDs impervious to electrical and mechanical shock, vibration, frequent switching and environmental extremes. With an average life span for White LEDs of 50,000-plus hours (5 years), LEDs operate reliably year after year and are virtually maintenance free.

16. Product: Automatic Identification System (AIS): TITAN AIS Display Software

Brief Overview:

The need for a reliable and effective AIS network is becoming increasingly important as the power of AIS is being realized and that it indeed is an effective monitoring tool which is being implemented globally.

TITAN Server provides a scaleable method of implementation of an AIS network. One single transponder can serve numerous clients. By implementing it at a site and utilizing TCP/IP as the carrier method, it could be brought into an office environment where it can be also used as a local area server taking care of a surveillance office or port facility for example.

The TITAN Server is capable of remote servicing of transponders, buoys and other AIS related equipment. Constantly monitoring the health of the network the main operator is quickly able to determine if any node is not working.

This low cost solution has proven itself in numerous locations and is used by a variety of users from military to ports to marine exchanges who need a reliable method of getting AIS data to a central source, TITAN Server is the natural choice.

Source product link: http://www.xanatosholdings.com/index_files/TitanServer.htm

17. Article: "Sprint Announces Upcoming Availability of MOTKRZR, MOTORAZR, and MOTOSLVR with Advanced Power Vision Capabilities"

OVERLAND PARK, Kan. — 10/03/2006

Sprint (NYSE: S) today announced plans to launch the latest Motorola handset, MOTOKRZR; the popular MOTORAZR; and the candy-bar style handset, MOTOSLVR. Harnessing the speed of Sprint's Power Vision(SM) EVDO network, Sprint's MOTOKRZR, MOTORAZR and MOTOSLVR will enable customers to access the latest news, music and entertainment content at broadband-like speeds.

On Sprint's Power Vision(SM) network, MOTOKRZR, MOTORAZR and MOTOSLVR will be the only versions of these handsets to offer access to:

NFL Mobile, a Sprint-exclusive wireless application that brings fans access to same-day video highlights, customizable real-time statistics, scores, injury reports and other information updated every two seconds.

Sprint TV(SM) with more than 50 channels of live television and on-demand video and audio.

Sprint Movies, the first "pay-per-view" service for mobile phones in the U.S. that streams full-length movies, including recent box-office hits and timeless favorites from Buena Vista VOD, Lionsgate, Sony Pictures Home Entertainment and Universal Pictures. Sprint Movies offers a growing list of more than 45 titles, including "National Treasure," "Spider-Man 2" and "Scarface."

Sprint Music Store(SM), which allows users to browse and wirelessly download full-length songs directly to their phone.

Sprint Power View, the industry's first made-for-mobile sports and entertainment video programming network.

Just recently announced by Motorola as the next generation of the world-renowned MOTORAZR, MOTOKRZR is made with elegant and robust materials, including magnesium, polished chrome and hardened glass. The solid glass on the front – a technological breakthrough and a first for a large-volume handset – results in a fashionable, high-gloss luster balancing the soft velvet-like finish on the back.

Sprint's MOTOKRZR, MOTORAZR and MOTOSLVR are expected to be available by early November. Customers can register at www.Sprint.com/MOTOKRZR to be contacted about purchasing MOTOKRZR as soon as it becomes available. All three devices will offer advanced features including high-quality cameras, Phone as Modem (PAM) capabilities, Bluetooth® wireless technology and Telenav® GPS application offering turn-by-turn driving directions.

See other link for additional information:

http://www.gearlive.com/index.php/news/article/sprint-introduces-trio-motorola-devices-10040245/

18. Website: GPS/GIS Product Listing

link: http://ecat.giscafe.com/product_list.php?category_id=3000120

19. Website: Ultra Violet Cyclops Sensors

link: http://www.turnerdesigns.com/newsletter/newsletter_0107_full.html#uv

20. Website: 10-AU-005-CE Field Fluorometer

Features and options can be found in:

http://www.oilinwatermonitors.com/products/1au005.html

Also check the pdf file's "Technical Data Sheet", which has detailed information about the product:

http://www.oilinwatermonitors.com/pdf/10au.pdf

21. Article: "ASA Models Used to Simulate Dispersed Oil"

One of the response tools available to oil spill responders is the application of dispersant. Dispersant is analogous to detergent used to break up grease: it facilitates the break up of oil into the water column. Dispersants are used to reduce the amount of oil on the water surface and thereby minimize the amount of oil that may impact sensitive shorelines and wildlife.

There is a need to monitor the in-water concentrations of dispersed oil to determine dispersant efficiency and environmental impacts. Repeated sampling of the same plume(s) is essential to determine the exposure of water column organisms and to justify the environmental trade-offs inherent in the use of dispersants. However, locating the dispersed oil plume as it moves over time is a significant challenge.

To address this issue ASA worked with the California Department of Fish and Game, Office of Spill Prevention and Response (OSPR). OSPR is tasked with minimizing environmental impacts to California's natural resources. This entails determination of the natural resource impacts of dispersed oil versus other response options so the relative impacts of different options can be used to guide response decisions during future spills. Modeling has been used to evaluate potential impacts to water column organisms. Up until this time however, little or no field data were available to validate model results.

To fill this void, fluorescein dye was intentionally spilled into the ocean to simulate a dispersed oil plume. ASA provided analysis and modeling of the dye transport and dispersion using ASA's oil spill impact model SIMAP. The field studies simultaneously measured dye locations and concentrations, winds, and surface and subsurface currents. Surface currents were measured by CODAR, a high-frequency radar system, and subsurface currents were measured by drogued drifters. The collected field data was then used to calibrate and validate the SIMAP simulations.

The analysis indicated that dye movements were better represented by the drogued drifters than by the surface CODAR because the dye is dispersed in the water. The CODAR currents would be predictive of floating oil drift, but would not necessarily predict subsurface oil movement in cases where the wind drift is significant and not aligned with the subsurface currents. By calibrating and subsequently validating SIMAP using data acquired in the field study, new improvements to SIMAP make it more effective for future sampling efforts and as a tool to predict water column concentrations and the impacts and biological effects of dispersed oil.

Check link for sample photos of testing:

http://www.appsci.com/news/2007/february2007.htm

22. Article: "BP Uses Latest ASA Technology for Response Preparedness"

BP Angola recently acquired Version 6.0 of ASA's OILMAP and SARMAP. The version 6.0 technology allows users to tap into the power of web services to immediately access weather data and environmental information such as forecast winds and currents which are essential for accurate oil spill and search & rescue response.

The systems delivered to BP allow OILMAP and SARMAP to connect to the COASTMAP data server for on-line 72-hour forecasts for winds and surface currents for a region. Wind data is available globally and regionally from a variety of government and commercial sources, but high resolution surface currents are still a challenge to predict on a global scale, so regional hydrodynamic models are required. For West Africa, ASA and ASA South America are running operational hydrodynamic models that provide the data required to make accurate drift predictions for missing persons or oil spills.

ASA South America has extensive experience in running operational forecast models in the South Atlantic for South American oil companies and was able to develop a new operational hydrodynamic model for the West Africa region. The scientists of ASA South America, lead by Dr. Jose Edson Pereira, have been continuing to improve the model performance by comparing data to observations and drifting buoys.

Jim Thornborough, BP's project lead for the OILMAP and SARMAP system, sees the latest software upgrade as a great modeling and information tool set to assist in their emergency response. "The ability to have real-time forecast winds and current data as part of our search and rescue and oil spill response saves time, letting us allocate resources to where they can be used best to save lives and protect the environment."

This technology is also used by the US Coast Guard, and other international response organizations.

Check link for sample photos of testing:

http://www.appsci.com/news/2007/february2007.htm

23. Title: "Integral solution for oil spill detection using SAR data" (pdf file)

Abstract. Oil spills cause huge material damage. Oil and oil products spills may occur at any stage of the offshore oil production and transportation cycle. Therefore taking into account the current trends of oil production, the system developing for shelf and tank fleet monitoring becomes very crucial today.

This paper describes the technology being implemented to improve oil spill monitoring and surveillance, to ensure SAR data acquisition and processing and to develop geographic information systems in support of spill response decision making. The results of technology implementation are also presented below.

24. Title: "SeaSonde: For automated, real-time surface mapping and wave monitoring" (pdf file)

See The Ocean from an Amazing Perspective:

The SeaSonde HF radar system by CODAR Ocean Sensors is your solution for making continuous, wide-area ocean observations. The SeaSonde will provide you with years of real-time data over large coverage areas, with ranges up to 200 km -- This is not possible with any other technology! The SeaSonde is a compact, non-contact surface current and wave measurement system that can be deployed and maintained easily, and will perform even during extreme weather conditions such as hurricanes.

Link for descriptive information about SeaSonde:

http://www.codaros.com/images/products/seasonde_products/SeaSonde_product_sheet.pdf

25. Website: Panasonic Toughbook 19 and 30

Product Links:

http://www.panasonic.com/business/toughbook/fully-rugged.asp

http://www.panasonic.com/business/toughbook/notebook-computers.asp (contains other products as well)

26. Article: "Better Bugs for Oil Spills"

Just a fun and interesting read regarding oil-eating bacteria, *Alcanivorax borkumensis.*

Link: http://www.technologyreview.com/read_article.aspx?id=17230

27. Article: "New Online Tool Demonstrates Oil Skimming Technology"

Cleveland, OH — Abanaki Corporation has released a new series of online animated demos that illustrate the technology behind its leading models of oil skimming equipment. These demos – available online at www.abanaki.com – are the first of their kind, and are designed to help engineers, plant managers and related professionals choose the oil skimming technology that best meets their needs.

"Seeing precisely how our oil skimming equipment works through these animated demos helps engineers quickly identify the right model for their treatment needs," said Abanaki president Tom Hobson. "Proven in thousands of applications, oil skimming is the most

cost-effective, low-maintenance and reliable method of separating oil and grease from water."

With Flash animation, Abanaki's online demos illustrate the technology behind the following five products:

- The **Oil Grabber Model 8** is the company's most widely used oil skimmer, utilizing a continuous belt and wiper to remove up to 40 gallons of oil per hour from the fluid surface. Its rugged design allows its use in even the harshest applications.
- **The Tote-it portable oil skimmer** removes up to 12 gallons of oil per hour and is easy hand carried from application to application. It light weight portability with a heavy duty industrial duty design.
- The **Solar-Powered PetroXtractor** is designed for use in monitoring wells and other small openings with large vertical drops to depths of up to 100 feet. Its self sufficient design makes it suitable for use in even the remotest applications.
- The **Q-VAC 100** is powerful wet vacuum that attaches easily to a standard drum to remove coolant from machine sumps or clean up spills. Requiring no electricity, this quiet unit uses a standard air line to provide its power.
- The air powered **Chiperator** makes recycling old coolant easy by filtering fluids contaminated with chips and other solids, returning clean coolant to the machine sump in less than two minutes.
- The **Grease Grabber** oil skimmer is specially designed for removing grease from water. It has an integrated heater to keep grease moving even in sub-zero temperatures.

Engineers can view these animated demos or find more information about Abanaki's oil skimming products at www.abanaki.com/039.

28. Title: "Oil Spill Cleanup from Sea Water by Sorbent Materials" (pdf file)

ABSTRACT. Three sorbents were compared in order to determine their potential for oil spill cleanup. Polypropylene nonwoven web, rice hull, and bagasse with two different particle sizes were evaluated in terms of oil sorption capacities and oil recovery efficiencies. Polypropylene can sorb almost 7 to 9 times its weight from different oils. Bagasse, 18 to 45 mesh size, follows polypropylene as the second sorbent in oil spill cleanup. Bagasse, 14 to 18 mesh size, and rice hull have comparable oil sorption capacities, which are lower than those of the two former sorbents. It was found that oil viscosity plays an important role in oil sorption by sorbents. All adsorbents used in this work could remove the oil from the surface of the water preferentially.

29. Title: “Development of a Non Contact Oil Spill Detection System” (pdf file)

Abstract.

Our goal in developing an optical non contact oil spill detection sensor was to create an automated system that remotely monitors for petroleum spills and sheens and provides instant (near real time) notification to authorities or users if and when a spill occurs. Detection in real time would then allow response personnel to contain spill pollution before extensive damage is done to wildlife, environment, public assets, and economic interests. This instrument may also provide select users (i.e., stormwater permit holders and petrochemical facility operators) with a new tool to meet regulatory requirements for spill prevention and reporting. Indeed any spill that is successfully prevented or minimized as a result of real time detection benefits not just the users of the sensor, but all waterway stakeholders, and the environment and society as a whole (in keeping with the "One Ocean" theme of this years Ocean's conference). This paper describes: 1) research and development of a reliable, economical, optical, non contact, oil-on-water petroleum detection sensor; 2) experience, results and evaluations drawn from extensive laboratory testing, and real world performance, using a range of hydrocarbons and related products (and differing environmental conditions, concentrations, ranges, etc.); and finally, 3) discussion of applications and deployment opportunities for which this technology provides a viable new tool as a preventative countermeasure and early warning system against potentially catastrophic oil spills. This paper discusses a number of objectives that were met during the development of this "Slick Sleuth/spl trade/" oil spill detection sensor. The sensor was proven to provide reliable detection signal even when only trace amounts or a very slight sheen of oil was present The design goal of a near-zero maintenance system was accomplished by use of a downward looking optical sensor installed above the water. This above water technique allowed us to eliminate all contact with in-water oil or debris, prevented biological or other fouling issues, and eliminated need for in-water mooring. The sensor was shown to provide successful consistent detection of petroleum on water when installed at 5 meters above (varying tidal) water surface, as wel- l as at closer ranges and at fixed distances to the target area. This paper summarizes our investigation and testing of the limitations, strengths, sensitivity, and adaptability of the "Slick Sleuth/spl trade/" oil spill detection sensor as we attempted to determine its effectiveness in a wide range of deployment arrangements. A few target applications include monitoring for spills around/in or on offshore structures and buoys, coasts, ports and harbor, piers and marine terminals, industrial culverts/sumps and outfalls, inland waterways, etc. This paper also examines use of this optical sensor to detect oil sheens in high current velocity regimes (i.e., 4 knots current speed), it's immunity to wave action, and the ability of the sensor to be used for continuous monitoring (as opposed to periodic sampling intervals). In conclusion we summarize results from our testing and performance evaluations, and suggest a few goals for future design modifications and improvements.

30. Title: “In Situ Device for Detection of Oil Spill in Seawater” (pdf file)

Abstract.

The purpose of this study was to design an innovative, real time, cost effective, and environment friendly in situ technique for the surface measurement of oil spill thickness. The technique was based on the concept of the electrical conductivity to characterize and to measure the thickness of an oil layer in seawater. The system was designed to monitor the seawater pollution continuously and to send an alarm if the oil level exceeds a certain limit. The results of this study are very important as they may contribute to the development of advanced practices in oil spill detection.

The system is the most suitable choice when considering human and environmental demands for the following:

– To develop a compact and cost-effective automated oil spill sensing technology for early detection and alarm of petroleum hydrocarbon leaks and spills.
– To recognize the positive potential of detecting oil pollution in seawater by means of reducing the cost of pollution removal.
– To avoid and abate any adverse environmental or health impact from defense utilization of oil detection process.
– To develop novel instrumentation to deal with the challenges of monitoring and assessing the quality and status of hostile marine environments.
– To develop a measurement method for oil detection that can save a significant amount of money.

31. Title: “Development of a Non Contact Oil Spill Detection System” (pdf file)

Abstract – Our goal in developing an optical non contact oil spill detection sensor was to create an automated system that remotely monitors for petroleum spills and sheens and provides instant (near real time) notification to authorities or users if and when a spill occurs. Detection in real time would then allow response personnel to contain spill pollution before extensive damage is done to wildlife, environment, public assets, and economic interests. This instrument may also provide select users (i.e. stormwater permit holders and petrochemical facility operators) with a new tool to meet regulatory requirements for spill prevention and reporting. Indeed any spill that is successfully prevented or minimized as a result of real time detection benefits not just the users of the sensor, but all waterway stakeholders, and the environment and society as a whole (in keeping with the “One Ocean” theme of this years Ocean’s conference).

This paper describes: 1) Research and development of a reliable, economical, optical, non contact, oil-on-water petroleum detection sensor; 2) Experience, results and evaluations drawn from extensive laboratory testing, and real world performance, using a range of hydrocarbons and related products (and differing environmental conditions, concentrations, ranges, etc.); and finally, 3) Discussion of applications and deployment

opportunities for which this technology provides a viable new tool as a preventative countermeasure and early warning system against potentially catastrophic oil spills.

This paper discusses a number of objectives that were met during the development of this "Slick Sleuth™" oil spill detection sensor. The sensor was proven to provide reliable detection signal even when only trace amounts or a very slight sheen of oil was present. The design goal of a near-zero maintenance system was accomplished by use of a downward looking optical sensor installed above the water. This above water technique allowed us to eliminate all contact with in-water oil or debris, prevented biological or other fouling issues, and eliminated need for in-water mooring. The sensor was shown to provide successful consistent detection of petroleum on water when installed at 5 meters above (varying tidal) water surface, as well as at closer ranges and at fixed distances to the target area. This paper summarizes our investigation and testing of the limitations, strengths, sensitivity, and adaptability of the "Slick Sleuth™" oil spill detection sensor as we attempted to determine its effectiveness in a wide range of deployment arrangements. A few target applications include monitoring for spills around/in or on offshore structures and buoys, coasts, ports and harbor, piers and marine terminals, industrial culverts/sumps and outfalls, inland waterways, etc. This paper also examines use of this optical sensor to detect oil sheens in high current velocity regimes (i.e. 4 knots current speed), it's immunity to wave action, and the ability of the sensor to be used for continuous monitoring (as opposed to periodic sampling intervals).

In conclusion we summarize results from our testing and performance evaluations, and suggest a few goals for future design modifications and improvements.

Also check product site at: http://www.slicksleuth.com/

32. Title: "Method and apparatus for monitoring and measuring oil spills" (pdf file)

Abstract.
The present invention relates to an oil spill identification system and oil spill identification sensors to be used in connection with this system. The system is used primarily on fixed offshore structures, but may also be used on fixed onshore constructions. The sensor comprises a combination of a radar and at least a microwave radiometer. The data collected are transmitted to a control station. Preferably, the transmittal takes place at pixel level between the sensors and the control station. The control station processes the data received at pixel level and transmits data to an end-user, preferably through the internet. The invention also relates to a method for utilizing the system and a use of the system.

33. Website: Oil Spill Identification System (OSIS) Sensor System

Product site link: http://www.osis.biz/ss127.asp

34: Website: Potential Incident Simulation, Control and Evaluation System (PISCES2)

Product site link: http://www.transas.com/products/simulators/pisces/

35. Website: NOAA's GNOME (General NOAA Operational Modeling Environment)

Product site link:
http://response.restoration.noaa.gov/type_subtopic_entry.php?RECORD_KEY%28entry_subtopic_type%29=entry_id,subtopic_id,type_id&entry_id(entry_subtopic_type)=292&subtopic_id(entry_subtopic_type)=8&type_id(entry_subtopic_type)=3

GNOME latest product news available here:

http://response.restoration.noaa.gov/type_topic_entry.php?RECORD_KEY%28entry_topic_type%29=entry_id,topic_id,type_id&entry_id(entry_topic_type)=282&topic_id(entry_topic_type)=1&type_id(entry_topic_type)=3

36. Website: EPA: Measurement and Monitoring Technologies for the 21st Century [21M^2] – Open Path Technologies: Measurement at a Distance – LIDAR

Website Contents:

> Basic Operation
> Chemical Detection
> Demonstrated Uses in Environmental and Industrial Settings
> Monitoring Emissions from Industrial Processes
> Mobile Source Emissions
> Experimental and Potential Uses in Environmental and Industrial Settings
> Remote Sensing for Natural Gas Pipeline Leaks from Aircraft
> References

LIDAR Website link: http://clu-in.org/programs/21m2/openpath/lidar/

37. Article: "Airborne 1 Delivers LiDAR Ahead of Customer Expectation"

Airborne 1 Corporation has confirmed its strong standing in the industry with 97% of all projects being delivered before customer deadlines. A leading provider of advanced LiDAR services, rentals, and software worldwide, Airborne 1 is reconfirming its dedication to the LiDAR industry.

Airborne 1 has strived to be the best in the industry since its inception. The company has conducted a customer satisfaction survey of its clients to ensure they are getting what they want customized to their individual needs. After subjecting itself to a rigorous review of product quality and customer satisfaction survey, Airborne 1 has found it is on

the right track. “We wanted to know where we really stand on satisfaction not just where we think we stand,” said Airborne 1 COO Carolyn Weidell, “Doing self evaluations helps to continuously improve our service by tailoring it to our customer base.”

In response to the findings, Airborne 1 has launched a new ad campaign highlighting what customers said were most important to them including speed, quality, and value. The focal point of the ad is Airborne 1’s ability to get customers exactly what they want, the first time, on-time. To see the full ad, visit www.airborne1.com/needspeed.pdf.

Airborne 1 will continue with periodic reevaluations to ensure service always remains at its peak.

About Airborne 1

Airborne 1 Corporation (http://www.airborne1.com) provides advanced LiDAR technology and asset management for partners in the photogrammetry, surveying and mapping fields. From Turnkey Services, to Software/Training, Rentals, Fractional Ownership Plans, and Franchising Opportunities, Airborne 1 enables professionals worldwide to effectively enter the LiDAR market without having to incur the high costs of owning a sensor. Airborne 1’s digital mapping services and solutions include a dedicated team of LiDAR surveying experts, state-of-the-art Optech ALTM sensors, LiDAR data processing analysis and application development, as well as LiDAR field survey coordination and project management.

38. Title: “Shine Micro Debuts New AIS/Comm Devices at USCG Innovation Expo” (pdf file)

The high-sensitivity, long-range Radar Plus provides maximum AIS reception while the all new Blue Force Tracker combines AIS with MURS encrypted communications for law enforcement, harbor control, SAR and other applications.

Shine Micro, Inc., a leader in Automatic Identification System (AIS) technology and marine electronics, has introduced two new advanced communications products at the United States Coast Guard Annual Innovation Expo (June 26-28, 2006) in Tampa, FL. The new products, the Radar Plus™ SM1610 and Blue Force Tracking SM162-BFT, are designed to meet the need for on-the-water, over-the-air automatic identification and secure communications, according to Shine Micro President Mark Johnson.

See pdf file:

http://www.shinemicro.com/docs/USCGInnovationExpoNewsReleaseFinal06-26-06.pdf

39. “True Situational Awareness in Real Time” (pdf file)

Field Soft AIMSonScene SU Benefits:

- Handles command system processes so you can better focus on strategy, tactics, hazards, and responder accountability.
- A simple, yet informative, graphic user interface (GUI) keeps you updated on incident benchmarks, operational objectives, resource task assignments, and overall progress.
- Fully automated logging frees you from the keyboard and after action narrative wriing.
- Fully configurable so it works the way you do on the scene.
- System timers and prompts let you act, rather than react, throughout the incident.
- Automatic generation of an incident briefing form (ICS 201) makes transition from initial to extended response operations fast, simple, easy, and substantially more efficient.

link: http://www.fieldsoft.com/pdf/aimsonscene_single_user.pdf

Field soft Company website (for product detail):

http://www.fieldsoft.com/

Outline ref	ID	CAPTURED	IDEAS	DESCRIPTION	DATE	REGION	REMARKS
?	2		hand-held electronics	specific NOSC/Region input?	03/23/07	?	
5.1	3		skimming technologies	specific NOSC/Region input?	03/23/07	?	
6.1	4		lighting systems	specific NOSC/Region input?	03/23/07	?	
4.2.2, other	5		tools linking response efforts with hbr security monitoring	CNRSW discussion group	03/16/07	Southwest	
3.2	6	A	improved predictive modeling/nowcasting of spills	CNRSW discussion group	03/16/07	Southwest	
?	7	S	integrating oil sensors into response mgt tools	CNRSW discussion group	03/16/07	Southwest	
4.2.2	8	C	linking command centers for oil spill response	CNRSW discussion group	03/16/07	Southwest	
2,3	9	S,A	improved oil spill assessment capability (Chuck's Em 032706 modifies: locate and track magnitude and thickness, especially in reduced visibility conditions, e.g., night, weather, sea state)	simple to complex, aerial viz, IR, UV; oil film thickness; aerial team conducts survey, on-water team performs detailed measurements of thickness, etc based on aerial team info (email has more details)	03/22/06	Northwest	
4.1	10	C	Common Operational Picture (COP)	build with AIS transponder network, BFT, ICAN (very interesting; integration of AIS into Scan Eagle UAV is a current initiative of C6F)	03/22/06	Northwest	
2.6	11	S	airborne sensor for oil spill boundaries	LIDAR or low power inverse SAR, detecting changes in sea surface	03/22/06	Northwest	see also 24 & J & L
2	12	S	UV oil detection lights (Shipyard input indicating they do no want new integrated system)	flexible approach using portable devices installed by Shipyard, based on emerging needs (projects, berthed ships, etc.), not a fixed system; could be tied into alerting framework (e.g., simply dialing a phone #)	03/22/06	Northwest	Shipyard input to Brown
2.2	13	S	nighttime oil tracking pads with reflective coating	floats with oil, reflective or has small flashing light	03/22/06	Northwest	see also row letter "I"
5.2	14	R	improved oil absorbent pad	that could pick up a light sheen	03/22/06	Northwest	
5.1.2/3	15	R	supplementary oil skimmer device for work boat	attached when work boat tows boom or skimmer	03/22/06	Northwest	
6.1	16	O	portable, hi-powered LED lighting system	operates off 12-v auto or 110 AC or other power sources	03/22/06	Northwest	
2.3	17	A	hand-held identification/fingerprinting tool	uses sheen sample, IDs product in lieu of lab analysis	03/22/06	Northwest	
3.4	18	A	portable meter for predicting spill evaporation rates	by taking temp of water, air, wind speed, etc	03/22/06	Northwest	
3.2	19	A	hand-held modeling tool	input type of oil, elapsed time, geo-coordinates, polls & uses actual tides and winds	03/22/06	Northwest	see nowcasting entry line 6 & 21
?	20	C	other portable electronic tools to speed up the info flow	so we don't need to rely on NOAA	03/22/06	Northwest	
3.2	21	A	oil spill modeling for Pearl Harbor	accidental spill & Arizona trajectory, user-friendly interface	04/05/07	Hawaii	see also lines 6 & 19
1.1	22		booming ops at Port Allen (resp to Chuck)	Chuck's concept pic (PortAllenBooming.pdf) 032607	03/27/07	Hawaii	
3.1	23	C	situational awareness maps/COP (resp to Chuck)	draw ICS-201 on PC tablet, teleconf with non-NMCI laptop/cam, satellite to back up cell phone	03/27/07	Hawaii	Tammy Brown mentioned that Northwest uses Genwest's E-card
2.6	24	S	radio-controlled airplane/UAV	AeroEnvironment's smallest/cheapest is Wasp, we used in NAVCENT (North Arabian Gulf) from Navy ships.	03/27/07	Hawaii	see also 11 & J (airborne sensors)
2.1.3	25	S	sensors integrated into booms	after dark alerting, calibrate for DFM, JP5 (bilge?)	03/23/06	Southeast	se also H
1.1	26	P	spill containment capability added to security booms		03/23/06	Southeast	
1.2	27	P	temporary devices to slow currents during refueling	e.g., where fuel barges are unloading to a tank farm in a river (like the St. Johns River Florida); since River channel can not have obstructions.	03/23/06	Southeast	
1.1	28	P	temporary devices to protect sensitive areas	booms or portal devices to protect marshes and wetlands from oil getting into the wetlands and along shore lines and beaches that can be pre-stages or deployed quickly	03/23/06	Southeast	
2.6	29	S	VTOL Fire Scout	Fire Scout is the helicopter UAV being acquired as a LCS module	03/23/06	Northwest	
4.2.4	30	C	internet-based monitoring and reporting for situ aware		04/25/07	Mid-Atlantic	see also 23 & D
3.2/3, other	31	A	PISCES Spill Modeling & Networking	brief on LAN captured on Google search per Costello	04/25/07	Mid-Atlantic	REVIEW, compare to COASTS technologies
2.3	32	S	mobile fingerprinting capability	Ahura bought and checked out, not accurate enough	05/11/07	Hawaii	
			OTHER TECHNOLOGY IDEAS (from technologists)				
1.1	A		improved boom technologies	NAVFAC PA (EEC-4) proposal			
2.5	B		CODAR for actual current direction/speed	Doppler return differences using 2 radars	04/20/07		UNH CRRC has many other oil spill technologies
4.1	C	C	software & projector for Situation Group	maybe with a smart board for "writing" on top (for spills of National significance, NOAA comes in with this kind of stuff) vs. transparency map that can be erased and updated	06/07/06		
4.4.2	D	C	a web-accessible information system	aggregate contextual information and near real time information from a variety of sources (e.g., sensor, model output).	06/07/06		
4.4.1	E	C	central repository of data	Chuck's idea; could be linked with web ("E"); initial work in access, set up by Kyburg, could start with info in this spreadsheet and worked by Shayne/Ron	06/07/06		
4	F	C	spill kits: laptops, hardcopies of important documents, interconnect capabilities, fax capabilities (via cell phone?)	laptops have electronic reports, forms, access to Web versions of similar, and software for connecting/viewing and data sharing),	06/07/06		
4.2.2	G	C	Develop a wireless hotpsot for connecting multiple information sources/recipients together	see "P" for COASTS networking	06/07/06		
2.1.3	H		sensors integrated into security and/or boom systems		03/27/06		see also 25
2.2	I	A	sensors deployed on free-floating drifters	Katz Em 060706 adds idea for sensors to confirm (validate) model predictions as spill footprint changes	03/27/06		see also 13 (tracking pads)
2.6	J	S	aircraft-mounted sensors		03/27/06		see also 11 & 24 (UAVs)
5.1	K		skimmer technology (ice-breaking)	Lakosh (see 2 attach, orig email)	03/22/06		
?	L		various monitoring (incl oil thickness) & dispersant tech	San Ramon Dispersant/Technology workshop	02/06/07		REVIEW
?	M		tech ideas from ASTM meeting on Spill Response?	was there useful info from this San Diego meeting?	03/12/07		REVIEW
?	N	S,A,C	various technologies from NPREP San Diego 2007	digital wireless pen (Expedata DigiPen) for 102 forms, CHRIS Database search (OREIS Mobile), real-time video capture (Comvu PocketCaster), PDA Cell Phone (Palm Treo 700wx)	04/25/07		
4	O		Ron to contact Navy HLS POC (Rob George knows well)	Check CD from Maritime Security Conf, follow-up	04/02/07		
2,4	P		various sensor, comm, networking technologies experimented with in NPS COASTS	Ron's Reserve unit supporting the wireless networking of sensors & comms, including mini/micro UAVs, for Naval Postgraduate School	05/07/07		

4	Q		Stand up a dedicated command center	Chuck noted at June 06 drill there were 70 people but the physical and electronic setup could be greatly improved	06/07/06		
	R		airborne oil spill sensors	(1) LURSOT System: Laser Ultrasonic Remote Sensing of Oil Thickness - three-laser system produces and measures time-of-flight of ultrasonic waves in oil; (2) SLEAF: Scanning Laser Environmental Airborne Fluorosensor. Both systems are bulky and installed on Environment Canada's DC-3 aircraft			
	S		underwater UV spectroscopic detector	Navy patent (SSC-SD developed) for underwater UV fluorescence spectroscopy; has been transitioned commercially			
	T		aerial infrared thermography	Infrared camera (IR) system flown from small aircraft			
	U		tailored surfaces in oleophilic skimmers	improved recovery efficiencies found with grooved patterns, matched for oil type; recovery surface material; optimal oil thickness; temperature decrease; high drum rotation speed)			
	V		WAVe Current Information System (WAVCIS), a new online oceanographic and meteorological observing system being implemented off the Louisiana coast to provide critical information during offshore emergencies including oil spills. provides wave information (sea state) including wave height, period, direction of propagation, water level, surge, water column velocity profiles, and meteorological conditions on a near real time basis.	online information database for oil spill contingency planning including: enhancing cursory assessment of oil spill migration; precision numerical modeling of nowcasts for oil spill trajectories; archived data set to assess trajectory modeling; real-time environmental conditions for guiding application of dispersants and in situ burning; assist in forecasting conditions and spills for neighboring states.			Information from each station is transmitted via cellular satellite telephone to a base station at Louisiana State University where it undergoes quality control, post-processing and archiving in an online database, made available on the World Wide Web
	W		OILMAP Oil Spill Model (includes a trajectory and fates model for surface and subsurface oil, an oil spill response model, and stochastic and receptor models)	The trajectory and fates model predicts the transport and weathering of oil from instantaneous or continuous spills. Predictions show the location and weathering of the surface oil versus time. The model estimates the temporal variation of the oil's areal coverage, oil thickness, and oil viscosity. The model also predicts the oil mass balance or the amount of oil on the water surface, in the water column, evaporated, on the shore, and outside the study domain versus time.			The fate processes in the model include spreading, evaporation, entrainment or natural dispersion, and emulsification. As an option OILMAP can also estimate oil-sediment interaction and associated oil sedimentation. OTHER Products are SIMAP and SARMAP
	X		OSIS Online Environmental Surveillance	Generates raw data for identification, tracking and quantification of oil spills within 2.5 nautical miles from the installation site (structures or vessels). The SensorPack contains active and passive microwave sensors, providing data for precise surface area and thickness estimate of an oil layer on the sea. Track up to 2.5 nm, quantitate up to 0.5 nm, oil spill between 0.1-1.5 mm thickness. Contrast other spec from in Remarks.			Sensors based on electro-magnetic sensors with different frequency bands able to identify submissions from 0.02 to 2.0 millimetres of oil on a water surface. Data is transmitted to the onshore central server (CS) from offshore sensor packs, and automated decision software transfers the sensor data into oil spill information and presents the result.
	Y		multispectral aerial imagery in the UV-Visible-NearIR spectral range, this project developing an algorithm for oil slick thickness measurement. Using an existing 4-channel sensor the project was also designed to evaluate the feasibility of developing a relatively economical, portable aerial oil spill mapping system that could be operationally deployed. (Ocean Imaging/CA State (Oil Spill Prevention and Response) work funded by Minerals Management Service)	The algorithm is adaptive in that it estimates oil thickness using spectral reflectance deviations from existing water color background characteristics, thus allowing it to be applied in different geographical areas with different water color conditions. The algorithm can measure film thicknesses between sheens and approximately 0.4-0.5mm. The range could potentially be extended by adding an infrared sensor to the system.			
	Z		bioremediation	Oil-eating bacteria offer new hope for bioremediation. Scientists in Europe have sequenced the genome for an oil-eating bacterium, a move that could pave the way for faster and more efficient ways to clean up oil spills.			See Also PRP (Petroleum Remediation Product), item #10 on Shayne's spreadsheet
	a		In situ electrical conductivity measuring device for detecting oil and measuring thickness	based on differences in electrical conductivity between oil and water, in-situ study completed, no indication of commercialization			
	b		Oil spill identification system using microwave radiometer (MWR) and radar unit	The system is used primarily on fixed offshore structures, but may also be used on fixed onshore constructions. The sensor comprises a combination of a radar and at least a microwave radiometer. The data collected are transmitted to a control station.			
			placeholder for Cheryl's info				
			Website: NOAA 's National Ocean Service (Office of Response and Restoration)	references, tools (e.g., software), publications			

(numeral)	RANK	IDEAS	DESCRIPTION	DATE	SOURCE	REMARKS
		PREVENT				
1		spill containment capability added to security booms	modify security booms to contain oil	03/23/06	Southeast, Mid-Atlantic	
1		temporary devices to slow currents during refueling	e.g., where fuel barges are unloading to a tank farm in a river (like the St. Johns River Florida); since River channel can not have obstructions.	03/23/06	Southeast	
1		temporary devices to protect sensitive areas	booms or portal devices to protect marshes and wetlands from oil getting into the wetlands and along shore lines and beaches; can be pre-staged or deployed quickly	03/23/06	Southeast	
		shore and ship-to-shore oil transfer spill prevention using RFID alignment checks (NAVFAC Pollution Ashore Need N 0488-07, Harasti proposal)	Use Radio Frequency Identification (RFID) in conjunction with handheld data collectors as a training aid with an electronic check-off for achieving proper system alignment. This technology coupled with the use of smart hose technology and valves can reduce the oils spills caused by human error and hardware failure which cover the majority of the spill causes.		SSC-SD relating NSWCCD idea	
1		improved boom technologies	NAVFAC PA (EEC-4) proposal is one example, to reduce fouling on oil booms (Hasselbeck proposal, NSWCD)		SSC-SD	
		SENSE				
2		hand-held identification/fingerprinting tool	uses sheen sample, IDs product in lieu of lab analysis	03/22/06	Northwest	
2		mobile fingerprinting capability	Ahura bought and checked out, not accurate enough	05/11/07	Hawaii	
		use existing security infrastructure for oil spill sensing	radars and cameras for perimeter and harbor security could be used for oil spill sensing & tracking		SSC-SD	
		images, audio and video by cell phone	Nearly all phones can take and send still images. ComVuPocketCaster and Palm Treo 700wx (demo'd at NPREP) are two examples (presented by USCG) of a new capability for standard 3G cell phones to provide real-time streaming video and audio capture, can be directly linked to Command Center visualization.		SSC-SD, Southwest	
2		sensors deployed on free-floating drifters	Katz Em 060706 adds idea for sensors to confirm (validate) model predictions as spill footprint changes	03/27/06	SSC-SD	see also tracking pads
2		nighttime oil tracking pads with reflective coating	floats with oil, reflective or has small flashing light	03/22/06	Northwest	see also row letter "I"
2		sensors integrated into booms and/or security systems	after dark alerting, calibrate for DFM, JP5 (bilge?)	03/23/06	Southeast	se also H
2		underwater UV spectroscopic detector	Navy patent (SSC-SD developed) for underwater UV fluorescence spectroscopy; has been transitioned commercially		SSC-SD	
2		UV oil detection lights (Shipyard input indicating they do not want new integrated system)	flexible approach using portable devices installed by Shipyard, based on emerging needs (projects, berthed ships, etc.), not a fixed system; could be tied into alerting framework (e.g., simply dialing a phone #)	03/22/06	Northwest	Shipyard input to Brown
2		airborne sensor for oil spill boundaries	LIDAR or low power inverse SAR, detecting changes in sea surface	03/22/06	Northwest	see also 24 & J & L
2		radio-controlled airplane/UAV with sensors (e.g., cameras, other)	e.g., AeroEnvironment's hand-launched Raven, Wasp, or other vendors. VTOL Fire Scout is helo UAV for LCS	03/27/07	Hawaii	see also 11 & J (airborne sensors)
2		airborne oil spill sensors: LURSOT for thickness and SLEAF for narrow bands oil	(1) LURSOT System: Laser Ultrasonic Remote Sensing of Oil Thickness - three-laser system produces and measures time-of-flight of ultrasonic waves in oil; (2) SLEAF: Scanning Laser Environmental Airborne Fluorosensor can detect narrow bands oil along shores. Both systems are bulky and installed on Environment Canada's DC-3 aircraft		SSC-SD	
2,3		improved oil spill assessment capabilities: locate and track magnitude and thickness, especially in reduced visibility conditions, e.g., night, weather, sea state)	simple to complex, aerial viz, IR, UV; oil film thickness; aerial team conducts survey, on-water team performs detailed measurements of thickness, etc based on aerial team info (Tammy's email has great detail on recommendations, includes note that Washington now requires nighttime tracking)	03/22/06	Northwest	
2		in-situ electrical conductivity measuring device for detecting oil and measuring thickness	based on differences in electrical conductivity between oil and water, in-situ study completed, no indication of commercialization		SSC-SD	
2		Oil spill identification system using microwave radiometer (MWR) and radar unit	Used primarily on fixed offshore structures, but may also be used on fixed onshore constructions. The sensor combines a radar and at least a microwave radiometer.		SSC-SD	
		high frequency (HF) radar ocean backscatter for ocean currents				
2		HF radar applications for actual current direction/speed for use in prediction/nowcasting spill movement	Coastal Ocean Dynamic Applications Radar (CODAR) measures doppler return differences from 2 or more radars, calibrated with current meters (e.g., ADCP). Radar limited due to capturing only surface currents and may miss just below surface.		SSC-SD	UNH CRRC has many other oil spill technologies
2		network of active and passive microwave sensors (different frequency bands) installed on structures and vessels (OSIS Online Environmental Surveillance)	OSIS generates raw data for identification, tracking and quantification of oil spills within 2.5 nautical miles from the installation site (structures or vessels). Provides data for surface area and thickness estimate of an oil layer on the sea. Track up to 2.5 nm, quantitate up to 0.5 nm, oil spill between 0.02-2.0 mm thickness. Data fed to server and automated into command center visualization.		SSC-SD	
2		multispectral aerial imagery in the UV-Visible-NearIR spectral range, this project is developing an algorithm for oil slick thickness measurement. (Ocean Imaging/CA State (Oil Spill Prevention and Response) work funded by Minerals Management Service)	algorithm is adaptive - estimates oil thickness using spectral reflectance deviations from existing water color background characteristics, allowing it to be applied in different geographical areas. Can measure film thicknesses between sheens and approximately 0.4-0.5mm. The range could potentially be extended by adding an infrared sensor to the system.		SSC-SD	
2,3		WAVe Current Information System (WAVCIS) is a new online oceanographic and meteorological observing system being implemented off the Louisiana coast to provide critical information during offshore emergencies including oil spills. Provides wave information (sea state) including wave height, period, direction of propagation, water level, surge, water column velocity profiles, and meteorological conditions on a near real time basis.	Online information database for oil spill contingency planning including: enhancing cursory assessment of oil spill migration; precision numerical modeling of nowcasts for oil spill trajectories; archived data set to assess trajectory modeling; real-time environmental conditions for guiding application of dispersants and in situ burning; assist in forecasting conditions and spills for neighboring states. Information from each station is transmitted via cellular satellite telephone to a base station at Louisiana State University where it undergoes quality control, post-processing and archiving in an online database, made available on internet.		SSC-SD	
		ASSESS				
3		improved predictive modeling/nowcasting of spills	CNRSW discussion group	03/16/07	Southwest	
3		portable meter for predicting spill evaporation rates	by taking temp of water, air, wind speed, etc	03/22/06	Northwest	
3		hand-held modeling tool	input type of oil, elapsed time, geo-coordinates, polls & uses actual tides and winds	03/22/06	Northwest	see nowcasting entry line 6 & 21
3		oil spill modeling for Pearl Harbor	accidental spill & Arizona trajectory, user-friendly interface	04/05/07	Hawaii	see also lines 6 & 19
3		PISCES2 (Potential Incident Simulation, Control and Evaluation System) is an incident response simulator intended for preparing and conducting command centre exercises and area drills. Used by Southwest and perhaps others.	The application is developed to support exercises focusing on oil spill response. PISCES operating modes (preparation, running and debriefing) enhance the instructor's tasks in conducting a complex real-time exercise by maintaining 'exercise truth' for the participants, and recording key exercise events so that meaningful feedback can be provided on completion of an exercise.	04/25/07	Mid-Atlantic (also Southwest)	REVIEW, compare to COASTS technologies
3		GNOME oil spill model used by NOAA; hydrodynamic models developed for several Navy harbors by SSC-SD (e.g., San Diego, Pearl, Norfolk, Sinclair Inlet), other models advertised on web (e.g., OILMAP Oil Spill Model).	Models will need to be evaluated for accuracy, reliability, user-friendliness and specific capabilities. Predictions should predict and display the location, extent, transport and weathering of the surface oil versus time. Sub-surface routines more complex, as are all the aspects of spreading, evaporation, entrainment or natural dispersion, emulsification, oil-sediment interaction and associated oil sedimentation.		SSC-SD	The fate processes in the model include OTHER Products are SIMAP and SARMAP
		handheld/pocket database tools	OREIS develops Pocket PCs which permit database searches (e.g., USCG CHRIS Hazmat Chemical lookup) in the field (demo'd at NPREP)		SSC-SD, Southwest	

(numeral)	RANK	IDEAS	DESCRIPTION	DATE	SOURCE	REMARKS
		COORDINATE				
4		integrating sensor data into response management & coordination tools	to guide ongoing operations (CNRSW discussion group)	03/16/07	Southwest	
4		linking command centers for oil spill response	for real-time data/information exchange (CNRSW discussion group)	03/16/07	Southwest	
4		Common Operational Picture (COP) of response assets	build with AIS transponder network, Blue Force Tracker, International Communications and Navigation (ICAN)	03/22/06	Northwest	
4		other portable electronic tools to speed up the info flow	so we don't need to rely on NOAA (need to get specifics)	03/22/06	Northwest	
		capability to complete response forms electronically, remotely	and transmit directly to Command Center and others in the field		Mid-Atlantic	
4		situational awareness maps/COP	draw ICS-201 on PC tablet, teleconf with non-NMCI laptop/cam, satellite to back up cell phone	03/27/07	Hawaii	Tammy Brown mentioned that Northwest uses Genwest's E-card
4		ExpeData is a digital paper and pen system to permit the rapid wireless (via cell phone) transfer of information written on the ICS-201 form.	Upon transmission, it is interpreted and outputs image on the receiving end (e.g., Command center or another field station).		SSC-SD, Southwest	
4		internet-based monitoring and reporting for situational awareness		04/25/07	Mid-Atlantic	see also 23 & D
		GENWEST E-Card for tracking resources in response	stand-alone system for on-site response equipment tracking. Based on ICS-specific resource tracking methods. Ecard provides near real time equipment tracking combined with the ability to summarize equipment status on ICS-standard forms (e.g., ICS-209).	03/27/07	Hawaii	
4		software & projector for Situation Group	consider a smart board for "writing" on top (for spills of National significance, NOAA comes in with this kind of stuff) vs. transparency map that can be erased and updated	06/07/06	SSC-SD	
4		a web-accessible information system	aggregate contextual information and near real time information from a variety of sources (e.g., sensor, model output).	06/07/06	SSC-SD	
4		central repository of data		06/07/06	SSC-SD	
4		spill kits: laptops, hardcopies of important documents, interconnect capabilities, fax capabilities (via cell phone?)	laptops have electronic reports, forms, access to Web versions of similar, and software for connecting/viewing and data sharing),	06/07/06	SSC-SD	
4		develop a wireless hotpsot for connecting multiple information sources/recipients together	see also AIS recommendation, linking Command Ctrs, and NPREP demo tools	06/07/06	SSC-SD	
		Incident Management System Software: AIMSonScene SU	AIMSonScene SU is a software for area commanders and incident commanders who must actively manage strategy, tactics, and hazards. The software is a fast, simple, and easy alternative to tactcal worksheets and tactical magnet boards.		SSC-SD	
		RECOVER				
5		improved oil absorbent pad	that could pick up a light sheen	03/22/06	Northwest	
5		improved skimming technologies	general recommendation, input of CNIC based on his understanding of NOSC inputs	03/23/07	CNIC	
5		tailored surfaces in oleophilic skimmers	improved recovery efficiencies found with grooved patterns, matched for oil type; recovery surface material; optimal oil thickness; temperature decrease; high drum rotation speed)		SSC-SD	
5		supplementary oil skimmer device for work boat	attached when work boat tows boom or skimmer	03/22/06	Northwest	
5		bioremediation	Placeholder only, unclear whether any efforts have been proven operationally and developed commercially		SSC-SD	See Also PRP (Petroleum Remediation Product), item #10 on Shayne's spreadsheet
		SUPPORTING TECHNOLOGIES				
6		lighting systems	general recommendation, input of CNIC based on his understanding of NOSC inputs	03/23/07	CNIC	
6		portable, hi-powered LED lighting system	operates off 12-v auto or 110 AC or other power sources	03/22/06	Northwest	
2,3,4		various technologies from NPREP San Diego 2007	digital wireless pen (Expedata DigiPen) for 102 forms, CHRIS Database search (OREIS Mobile), real-time video capture (Comvu PocketCaster), PDA Cell Phone (Palm Treo 700wx)	04/25/07	SSC-SD	
		tools linking response efforts with hbr security monitoring	CNRSW discussion group	03/16/07	Southwest	
		booming ops at Port Allen (resp to Chuck)	Chuck's concept pic (PortAllenBooming.pdf) 032607	03/27/07	Hawaii	
		placeholder for Cheryl's info				
		Website: NOAA 's National Ocean Service (Office of Response and Restoration)	references, tools (e.g., software), publications			

RANK	IDEAS	DESCRIPTION	REFERENCE	DATE	SOURCE
	PREVENT				
	spill containment capability added to security booms		Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast
	temporary devices to slow currents during refueling	e.g., where fuel barges are unloading to a tank farm in a river (like the St. Johns River Florida); since River channel can not have obstructions.	Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast
	temporary devices to protect sensitive areas	booms or portal devices to protect marshes and wetlands from oil getting into the wetlands and along shore lines and beaches; can be pre-staged or deployed quickly	Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast
	improved boom technologies	NAVFAC PA (EEC-4) proposal	Elizabeth Hasselbeck (word doc "FY07OilBoom", in email folder), "Antifouling Oil Boom for Reduced Maintenance and Extended Service Life"		SSC-SD
	SENSE				
	hand-held identification/fingerprinting tool	uses sheen sample, IDs product in lieu of lab analysis	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	mobile fingerprinting capability	Ahura bought and checked out, not accurate enough	Pange Em 051107	05/11/07	Hawaii
	images, audio and video by cell phone	ComVuPocketCaster and Palm Treo 700wx (demo'd at NPREP) are just two examples (presented by USCG) of probably several standard 3G cell phones which provide real-time video and audio capture. Nearly all phones can take and send still images.			SSC-SD, Southwest
	integrating oil sensors into response mgt tools	CNRSW discussion group	Katz Em 031607	03/16/07	Southwest
	sensors integrated into security and/or boom systems		Katz Em 032706	03/27/06	SSC-SD
	sensors deployed on free-floating drifters	Katz Em 060706 adds idea for sensors to confirm (validate) model predictions as spill footprint changes	Katz Em 032706 (& Katz Em 060706)	03/27/06	SSC-SD
	nighttime oil tracking pads with reflective coating	floats with oil, reflective or has small flashing light	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	sensors integrated into booms and/or security systems	after dark alerting, calibrate for DFM, JP5 (bilge?)	Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast
	underwater UV spectroscopic detector	Navy patent (SSC-SD developed) for underwater UV fluorescence spectroscopy; has been transitioned commercially			SSC-SD
	UV oil detection lights (Shipyard input indicating they do not want new integrated system)	flexible approach using portable devices installed by Shipyard, based on emerging needs (projects, berthed ships, etc.), not a fixed system; could be tied into alerting framework (e.g., simply dialing a phone #)	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	airborne sensor for oil spill boundaries	LIDAR or low power inverse SAR, detecting changes in sea surface	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	aerial infrared thermography for detecting areal extent plume	Infrared camera (IR) system flown from small aircraft			SSC-SD
	radio-controlled airplane/UAV	e.g., AeroEnvironment's hand-launched Raven, Wasp, or other vendors. VTOL Fire Scout is helo UAV for LCS	Pang Em 032707	03/27/07	Hawaii
	airborne oil spill sensors: LURSOT for thickness and SLEAF for narrow bands oil	(1) LURSOT System: Laser Ultrasonic Remote Sensing of Oil Thickness - three-laser system produces and measures time-of-flight of ultrasonic waves in oil; (2) SLEAF: Scanning Laser Environmental Airborne Fluorosensor can detect narrow bands oil along shores. Both systems are bulky and installed on Environment Canada's DC-3 aircraft			SSC-SD
	improved oil spill assessment capabilities: locate and track magnitude and thickness, especially in reduced visibility conditions, e.g., night, weather, sea state)	simple to complex, aerial viz, IR, UV; oil film thickness; aerial team conducts survey, on-water team performs detailed measurements of thickness, etc based on aerial team info (Tammy's email has great detail on recommendations)	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	In situ electrical conductivity measuring device for detecting oil and measuring thickness	based on differences in electrical conductivity between oil and water, in-situ study completed, no indication of commercialization			SSC-SD
	Oil spill identification system using microwave radiometer (MWR) and radar unit	Used primarily on fixed offshore structures, but may also be used on fixed onshore constructions. The sensor combines a radar and at least a microwave radiometer.			SSC-SD
	CODAR for actual current direction/speed for use in prediction/nowcasting spill movement	Doppler return differences using 2 radars, calibrated with current meters (e.g., ADCP), limited due to capturing only surface currents and may miss just below surface.	UNH Coastal Response Rsch Ctr (Richter Em 042007), UCSD SIO Eric Terrill (Ron Gauthier)		SSC-SD
	aircraft-mounted sensors		Katz Em 032706	03/27/06	SSC-SD
	network of active and passive microwave sensors (different frequency bands) installed on structures and vessels (OSIS Online Environmental Surveillance)	OSIS generates raw data for identification, tracking and quantification of oil spills within 2.5 nautical miles from the installation site (structures or vessels). Provides data for surface area and thickness estimate of an oil layer on the sea. Track up to 2.5 nm, quantitate up to 0.5 nm, oil spill between 0.02-2.0 mm thickness. Data fed to server and automated into command center visualization.			SSC-SD
	multispectral aerial imagery in the UV-Visible-NearIR spectral range, this project is developing an algorithm for oil slick thickness measurement. (Ocean Imaging/CA State (Oil Spill Prevention and Response) work funded by Minerals Management Service)	algorithm is adaptive - estimates oil thickness using spectral reflectance deviations from existing water color background characteristics, allowing it to be applied in different geographical areas. Can measure film thicknesses between sheens and approximately 0.4-0.5mm. The range could potentially be extended by adding an infrared sensor to the system.			SSC-SD
	WAVe Current Information System (WAVCIS) is a new online oceanographic and meteorological observing system being implemented off the Louisiana coast to provide critical information during offshore emergencies including oil spills. Provides wave information (sea state) including wave height, period, direction of propagation, water level, surge, water column velocity profiles, and meteorological conditions on a near real time basis.	Online information database for oil spill contingency planning including: enhancing cursory assessment of oil spill migration; precision numerical modeling of nowcasts for oil spill trajectories; archived data set to assess trajectory modeling; real-time environmental conditions for guiding application of dispersants and in situ burning; assist in forecasting conditions and spills for neighboring states. Information from each station is transmitted via cellular satellite telephone to a base station at Louisiana State University where it undergoes quality control, post-processing and archiving in an online database, made available on internet.			SSC-SD
	ASSESS				
	improved predictive modeling/nowcasting of spills	CNRSW discussion group	Katz Em 031607	03/16/07	Southwest
	portable meter for predicting spill evaporation rates	by taking temp of water, air, wind speed, etc	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	hand-held modeling tool	input type of oil, elapsed time, geo-coordinates, polls & uses actual tides and winds	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	hand-held electronics	specific NOSC/Region input?	Blodgett Em 032307, summarizing NOSC feedback	03/23/07	?
	oil spill modeling for Pearl Harbor	accidental spill & Arizona trajectory, user-friendly interface	Pang Em 040507	04/05/07	Hawaii
	PISCES2 (Potential Incident Simulation, Control and Evaluation System) is an incident response simulator intended for preparing and conducting command centre exercises and area drills. Used by Southwest and perhaps others.	The application is developed to support exercises focusing on oil spill response. PISCES operating modes (preparation, running and debriefing) enhance the instructor's tasks in conducting a complex real-time exercise by maintaining 'exercise truth' for the participants, and recording key exercise events so that meaningful feedback can be provided on completion of an exercise.	Costello Em 042507	04/25/07	Mid-Atlantic (also Southwest)
	GNOME oil spill model used by NOAA; hydrodynamic models developed for several Navy harbors by SSC-SD (e.g., San Diego, Pearl, Norfolk, Sinclair Inlet), other models advertised on web (e.g., OILMAP Oil Spill Model).	Models will need to be evaluated for accuracy, reliability, user-friendliness and specific capabilities. Predictions should predict and display the location, extent, transport and weathering of the surface oil versus time. Sub-surface routines more complex, as are all the aspects of spreading, evaporation, entrainment or natural dispersion, emulsification, oil-sediment interaction and associated oil sedimentation.			SSC-SD
	handheld/pocket database tools	OREIS develops Pocket PCs which permit database searches (e.g., USCG CHRIS Hazmat Chemical lookup) in the field (demo'd at NPREP)			SSC-SD, Southwest

	COORDINATE				
	linking command centers for oil spill response	CNRSW discussion group	Katz Em 031607	03/16/07	Southwest
	Common Operational Picture (COP) of response assets	build with AIS transponder network, Blue Force Tracker, International Communications and Navigation (ICAN)	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	other portable electronic tools to speed up the info flow	so we don't need to rely on NOAA	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	situational awareness maps/COP	draw ICS-201 on PC tablet, teleconf with non-NMCI laptop/cam, satellite to back up cell phone	Pang Em 032707	03/27/07	Hawaii
	ExpeData is a digital paper and pen system to permit the rapid wireless (via cell phone) transfer of information written on the ICS-201 form.	Upon transmission, it is interpreted and outputs image on the receiving end (e.g., Command center or another field station).			SSC-SD, Southwest
	internet-based monitoring and reporting for situational awareness		Costello Em 042507	04/25/07	Mid-Atlantic
	GENWEST E-Card for tracking resources in response	stand-alone system for on-site response equipment tracking. Based on ICS-specific resource tracking methods. Ecard provides near real time equipment tracking combined with the ability to summarize equipment status on ICS-standard forms (e.g., ICS-209).		03/27/07	Hawaii
	software & projector for Situation Group	consider a smart board for "writing" on top (for spills of National significance, NOAA comes in with this kind of stuff) vs. transparency map that can be erased and updated	Katz Em 060706	06/07/06	SSC-SD
	a web-accessible information system	aggregate contextual information and near real time information from a variety of sources (e.g., sensor, model output).	Kyburg Em 060706	06/07/06	SSC-SD
	central repository of data		Katz Em 060706	06/07/06	SSC-SD
	spill kits: laptops, hardcopies of important documents, interconnect capabilities, fax capabilities (via cell phone?)	laptops have electronic reports, forms, access to Web versions of similar, and software for connecting/viewing and data sharing),	Katz Em 060706	06/07/06	SSC-SD
	develop a wireless hotpsot for connecting multiple information sources/recipients together	see also AIS recommendation, linking Command Ctrs, and NPREP demo tools	Katz Em 060706	06/07/06	SSC-SD
	Incident Management System Software: AIMSonScene SU	AIMSonScene SU is a software for area commanders and incident commanders who must actively manage strategy, tactics, and hazards. The software is a fast, simple, and easy alternative to tactcal worksheets and tactical magnet boards.			SSC-SD
	RECOVER				
	improved oil absorbent pad	that could pick up a light sheen	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	skimmer technology (ice-breaking)	Lakosh (see 2 attach, orig email)	Brown Em 032206 (in Blodgett032306)	03/22/06	SSC-SD
	various monitoring (incl oil thickness) & dispersant tech	San Ramon Dispersant/Technology workshop	Adobe file under Tech Meetings in LAN folder	02/06/07	SSC-SD
	tech ideas from ASTM meeting on Spill Response?	was there useful info from this San Diego meeting?		03/12/07	SSC-SD
	Ron to contact Navy HLS POC (Rob George knows well)	Check CD from Maritime Security Conf, follow-up	Ron & Rob attended Maritime Security Conference San Diego, 2-3 Apr 07	04/02/07	SSC-SD
	various sensor, comm, networking technologies experimented with in NPS COASTS	Ron's Reserve unit supporting the wireless networking of sensors & comms, including mini/micro UAVs, for Naval Postgraduate School	Ron has info on technical specs, concept of operations, and preliminary military utility assessment info	05/07/07	SSC-SD
	Stand up a dedicated command center	Chuck noted at June 06 drill there were 70 people but the physical and electronic setup could be greatly improved	Katz Em 060706	06/07/06	SSC-SD
	improved skimming technologies	general recommendation, input of CNIC based on his understanding of NOSC inputs	Blodgett Em 032307, summarizing NOSC feedback	03/23/07	CNIC
	tailored surfaces in oleophilic skimmers	improved recovery efficiencies found with grooved patterns, matched for oil type; recovery surface material; optimal oil thickness; temperature decrease; high drum rotation speed)			SSC-SD
	supplementary oil skimmer device for work boat	attached when work boat tows boom or skimmer	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	bioremediation	Placeholder only, unclear whether any efforts have been proven operationally and developed commercially			SSC-SD
	SUPPORTING TECHNOLOGIES				
	lighting systems	general recommendation, input of CNIC based on his understanding of NOSC inputs	Blodgett Em 032307, summarizing NOSC feedback	03/23/07	CNIC
	portable, hi-powered LED lighting system	operates off 12-v auto or 110 AC or other power sources	Brown Em (to Blodgett) 032206	03/22/06	Northwest

Please rank all ideas within their respective categories below (Prevent, Sense, Assess, Coordinate, Recover, Supporting). For example, in the Prevent Category, your highest priority would be 1 and your lowest would be 5.

If you have addtional ideas, you can either add them and rank them here or provide them to us separately.

RANK	IDEAS	DESCRIPTION	REFERENCE	DATE	SOURCE
	PREVENT				
	spill containment capability added to security booms	modify security booms to contain oil	Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast, Mid-Atlantic
	temporary devices to slow currents during refueling	e.g., where fuel barges are unloading to a tank farm in a river (like the St. Johns River Florida); since River channel can not have obstructions.	Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast
	temporary devices to protect sensitive areas	booms or portal devices to protect marshes and wetlands from oil getting into the wetlands and along shore lines and beaches; can be pre-staged or deployed quickly	Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast
	shore and ship-to-shore oil transfer spill prevention using RFID alignment checks (NAVFAC Pollution Ashore Need N-0488-07, Harasti proposal)	Use Radio Frequency Identification (RFID) in conjunction with handheld data collectors as a training aid with an electronic check-off for achieving proper system alignment. This technology coupled with the use of smart hose technology and valves can reduce the oils spills caused by human error and hardware failure which cover the majority of the spill causes.			SSC-SD relating NSWCCD idea
	improved boom technologies	NAVFAC PA (EEC-4) proposal is one example, to reduce fouling on oil booms (Hasselbeck proposal, NSWCD)	Elizabeth Hasselbeck (word doc "FY07OilBoom", in email folder), "Antifouling Oil Boom for Reduced Maintenance and Extended Service Life"		SSC-SD
	SENSE				
	hand-held identification/fingerprinting tool	uses sheen sample, IDs product in lieu of lab analysis	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	mobile fingerprinting capability	Ahura bought and checked out, not accurate enough	Pange Em 051107	05/11/07	Hawaii
	use existing security infrastructure for oil spill sensing	radars and cameras for perimeter and harbor security could be used for oil spill sensing & tracking			SSC-SD
	images, audio and video by cell phone	Nearly all phones can take and send still images. ComVuPocketCaster and Palm Treo 700wx (demo'd at NPREP) are two examples (presented by USCG) of a new capability for standard 3G cell phones to provide real-time streaming video and audio capture, can be directly linked to Command Center visualization.			SSC-SD, Southwest
	sensors deployed on free-floating drifters	Katz Em 060706 adds idea for sensors to confirm (validate) model predictions as spill footprint changes	Katz Em 032706 (& Katz Em 060706)	03/27/06	SSC-SD
	nighttime oil tracking pads with reflective coating	floats with oil, reflective or has small flashing light	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	sensors integrated into booms and/or security systems	after dark alerting, calibrate for DFM, JP5 (bilge?)	Davenport Em 031706 (in Blodgett 032306)	03/23/06	Southeast
	underwater UV spectroscopic detector	Navy patent (SSC-SD developed) for underwater UV fluorescence spectroscopy; has been transitioned commercially			SSC-SD
	UV oil detection lights (Shipyard input indicating they do not want new integrated system)	flexible approach using portable devices installed by Shipyard, based on emerging needs (projects, berthed ships, etc.), not a fixed system; could be tied into alerting framework (e.g., simply dialing a phone #)	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	airborne sensor for oil spill boundaries	LIDAR or low power inverse SAR, detecting changes in sea surface	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	radio-controlled airplane/UAV with sensors (e.g., cameras, other)	e.g., AeroEnvironment's hand-launched Raven, Wasp, or other vendors. VTOL Fire Scout is helo UAV for LCS	Pang Em 032707	03/27/07	Hawaii
	airborne oil spill sensors: LURSOT for thickness and SLEAF for narrow bands oil	(1) LURSOT System: Laser Ultrasonic Remote Sensing of Oil Thickness - three-laser system produces and measures time-of-flight of ultrasonic waves in oil; (2) SLEAF: Scanning Laser Environmental Airborne Fluorosensor can detect narrow bands oil along shores. Both systems are bulky and installed on Environment Canada's DC-3 aircraft			SSC-SD
	improved oil spill assessment capabilities: locate and track magnitude and thickness, especially in reduced visibility conditions, e.g., night, weather, sea state)	simple to complex, aerial viz, IR, UV; oil film thickness; aerial team conducts survey, on-water team performs detailed measurements of thickness, etc based on aerial team info (Tammy's email has great detail on recommendations, includes note that Washington now requires nighttime tracking)	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	in-situ electrical conductivity measuring device for detecting oil and measuring thickness	based on differences in electrical conductivity between oil and water, in-situ study completed, no indication of commercialization			SSC-SD
	Oil spill identification system using microwave radiometer (MWR) and radar unit	Used primarily on fixed offshore structures, but may also be used on fixed onshore constructions. The sensor combines a radar and at least a microwave radiometer.			SSC-SD
	HF radar applications for actual current direction/speed for use in prediction/nowcasting spill movement	High frequency (HF) radar ocean backscatter for ocean currents. Coastal Ocean Dynamic Applications Radar (CODAR) measures doppler return differences from 2 or more radars, calibrated with current meters (e.g., ADCP). Radar limited due to capturing only surface currents and may miss just below surface.	UNH Coastal Response Rsch Ctr (Richter Em 042007), UCSD SIO Eric Terrill (Ron Gauthier)		SSC-SD
	network of active and passive microwave sensors (different frequency bands) installed on structures and vessels (OSIS Online Environmental Surveillance)	OSIS generates raw data for identification, tracking and quantification of oil spill within 2.5 nautical miles from the installation site (structures or vessels). Provides data for surface area and thickness estimate of an oil layer on the sea. Track up to 2.5 nm, quantitate up to 0.5 nm, oil spill between 0.02-2.0 mm thickness. Data fed to server and automated into command center visualization.			SSC-SD
	multispectral aerial imagery in the UV-Visible-NearIR spectral range, this project is developing an algorithm for oil slick thickness measurement. (Ocean Imaging/CA State (Oil Spill Prevention and Response) work funded by Minerals Management Service)	algorithm is adaptive - estimates oil thickness using spectral reflectance deviations from existing water color background characteristics, allowing it to be applied in different geographical areas. Can measure film thicknesses between sheens and approximately 0.4-0.5mm. The range could potentially be extended by adding an infrared sensor to the system.			SSC-SD
	WAVe Current Information System (WAVCIS) is a new online oceanographic and meteorological observing system being implemented off the Louisiana coast to provide critical information during offshore emergencies including oil spills. Provides wave information (sea state) including wave height, period, direction of propagation, water level, surge, water column velocity profiles, and meteorological conditions on a near real time basis.	Online information database for oil spill contingency planning including: enhancing cursory assessment of oil spill migration; precision numerical modeling of nowcasts for oil spill trajectories; archived data set to assess trajectory modeling; real-time environmental conditions for guiding application of dispersants and in situ burning; assist in forecasting conditions and spills for neighboring states. Information from each station is transmitted via cellular satellite telephone to a base station at Louisiana State University where it undergoes quality control, post-processing and archiving in an online database made available on internet.			SSC-SD
	ASSESS				
	improved predictive modeling/nowcasting of spills	CNRSW discussion group	Katz Em 031607	03/16/07	Southwest
	portable meter for predicting spill evaporation rates	by taking temp of water, air, wind speed, etc	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	hand-held modeling tool	input type of oil, elapsed time, geo-coordinates, polls & uses actual tides and winds	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	oil spill modeling for Pearl Harbor	accidental spill & Arizona trajectory, user-friendly interface	Pang Em 040507	04/05/07	Hawaii
	PISCES2 (Potential Incident Simulation, Control and Evaluation System) is an incident response simulator intended for preparing and conducting command centre exercises and area drills. Used by Southwest and perhaps others.	The application is developed to support exercises focusing on oil spill response. PISCES operating modes (preparation, running and debriefing) enhance the instructor's tasks in conducting a complex real-time exercise by maintaining 'exercise truth' for the participants, and recording key exercise events so that meaningful feedback can be provided on completion of an exercise.	Costello Em 042507	04/25/07	Mid-Atlantic (also Southwest)
	GNOME oil spill model used by NOAA; hydrodynamic models developed for several Navy harbors by SSC-SD (e.g., San Diego, Pearl, Norfolk, Sinclair Inlet), other models advertised on web (e.g., OILMAP Oil Spill Model).	Models will need to be evaluated for accuracy, reliability, user-friendliness and specific capabilities. Models should predict and display the location, extent, transport and weathering of the surface oil versus time. It will be more complex and expensive to include high resolution 3D capability that assesses all the aspects of spreading throughout the water column, evaporation, entrainment or natural dispersion, emulsification, oil-sediment interaction and associated oil sedimentation.			SSC-SD

RANK	IDEAS	DESCRIPTION	REFERENCE	DATE	SOURCE
	handheld/pocket database tools	OREIS develops Pocket PCs which permit database searches (e.g., USCG CHRIS Hazmat Chemical lookup) in the field (demo'd at NPREP)			SSC-SD, Southwest
	COORDINATE				
	integrating sensor data into response management & coordination tools	to guide ongoing operations (CNRSW discussion group)	Katz Em 031607	03/16/07	Southwest
	linking command centers for oil spill response	for real-time data/information exchange (CNRSW discussion group)	Katz Em 031607	03/16/07	Southwest
	Common Operational Picture (COP) of response assets	build with AIS transponder network, Blue Force Tracker, International Communications and Navigation (ICAN)	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	tools linking response efforts with hbr security monitoring	CNRSW discussion group	Katz Em 031607	03/16/07	Southwest
	other portable electronic tools to speed up the info flow	so we don't need to rely on NOAA (need to get specifics)	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	capability to complete response forms electronically, remotely	and transmit directly to Command Center and others in the field			Mid-Atlantic
	situational awareness maps/COP	draw ICS-201 on PC tablet, teleconf with non-NMCI laptop/cam, satellite to back up cell phone	Pang Em 032707	03/27/07	Hawaii
	ExpeData is a digital paper and pen system to permit the rapid wireless (via cell phone) transfer of information written on the ICS-201 form.	Upon transmission, it is interpreted and outputs image on the receiving end (e.g., Command center or another field station).			SSC-SD, Southwest
	internet-based monitoring and reporting for situational awareness		Costello Em 042507	04/25/07	Mid-Atlantic
	GENWEST E-Card for tracking resources in response	stand-alone system for on-site response equipment tracking. Based on ICS-specific resource tracking methods. Ecard provides near real time equipment tracking combined with the ability to summarize equipment status on ICS-standard forms (e.g., ICS-209).		03/27/07	Hawaii
	software & projector for Situation Group	consider a smart board for "writing" on top (for spills of National significance, NOAA comes in with this kind of stuff) vs. transparency map that can be erased and updated	Katz Em 060706	06/07/06	SSC-SD
	a web-accessible information system	aggregate contextual information and near real time information from a variety of sources (e.g., sensor, model output).	Kyburg Em 060706	06/07/06	SSC-SD
	central repository of data		Katz Em 060706	06/07/06	SSC-SD
	spill kits: laptops, hardcopies of important documents, interconnect capabilities, fax capabilities (via cell phone?)	laptops have electronic reports, forms, access to Web versions of similar, and software for connecting/viewing and data sharing),	Katz Em 060706	06/07/06	SSC-SD
	develop a wireless hotpsot for connecting multiple information sources/recipients together	see also AIS recommendation, linking Command Ctrs, and NPREP demo tools	Katz Em 060706	06/07/06	SSC-SD
	Incident Management System Software: AIMSonScene SU	AIMSonScene SU is a software for area commanders and incident commanders who must actively manage strategy, tactics, and hazards. The software is a fast, simple, and easy alternative to tactcal worksheets and tactica magnet boards.			SSC-SD
	RECOVER				
	improved oil absorbent pad	that could pick up a light sheen	Brown Em (to Blodgett) 032206	03/22/06	Northwest
	improved skimming technologies	general recommendation, input of CNIC based on his understanding of NOSC inputs	Blodgett Em 032307, summarizing NOSC feedback	03/23/07	CNIC
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14. ABSTRACT

This Initiation Decision Report (IDR) describes a review and prioritization of potential technologies that could be used to reduce response costs and environmental damage from accidental spills of oil into the aquatic environment. The report was requested by the Naval Facilities Engineering Command (NAVFAC) Pollution Abatement Ashore (PAA) Program in response to a need submitted by the Navy oil spill user community to improve the management of oil spill response by more quickly detecting and responding to spills on water (PAA Need N-0404-06). This report evaluated technologies within six broad categories: Prevent, Sense, Assess, Coordinate, Recover, and Support. Navy On-Scene Coordinators (NOSCs) initially identified candidate technologies through the PAA Need Identification process. SPAWAR Systems Center San Diego (SSC San Diego) technologists identified additional technologies through direct solicitation for NOSC input and indirectly through conversations with NOSCs, other Navy responders, and spill contractors who were contacted during spill drills, exercises, and conferences, and after reviewing recent literature and the Internet. Technology ideas were compiled into a matrix that was sent out to each of the regional NOSCs so they could prioritize them in meeting their needs. The IDR provides a list of prioritized recommendations based on NOSC input, their needs rankings, and an initial assessment of feasibility and implementation.

15. SUBJECT TERMS

Mission Area: Environmental Science

common operational picture; oil spills; ranked technology matrix; spill containment; spill detection and tracking; spill kit; spill response; trajectory modeling; video data streaming

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